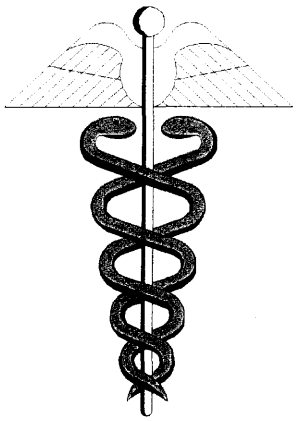
2006

Department of Veterinary and Biomedical Sciences: 2006 Annual Report

Department of Veterinary and Biomedical Sciences

2006 Annual Report

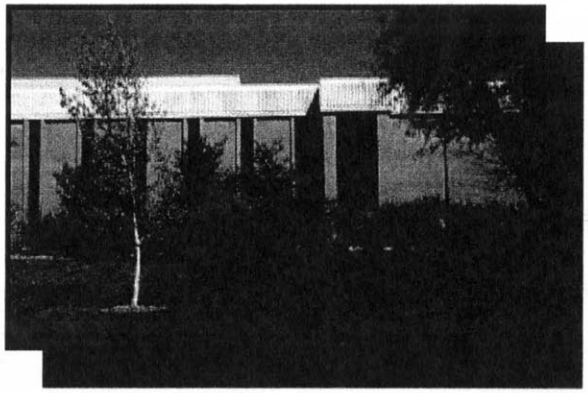


University of Nebraska-Lincoln
Institute of Agriculture and Natural Resources

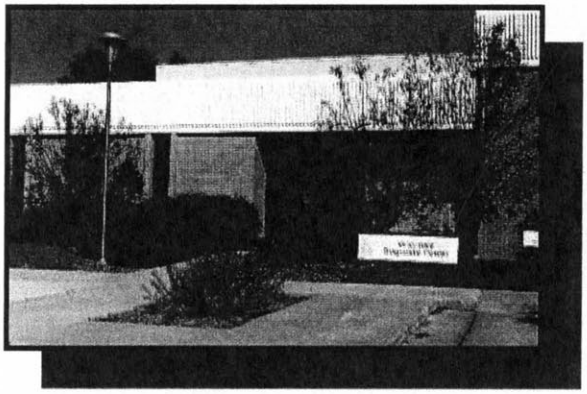
Department of Veterinary and Biomedical Sciences

Facilities

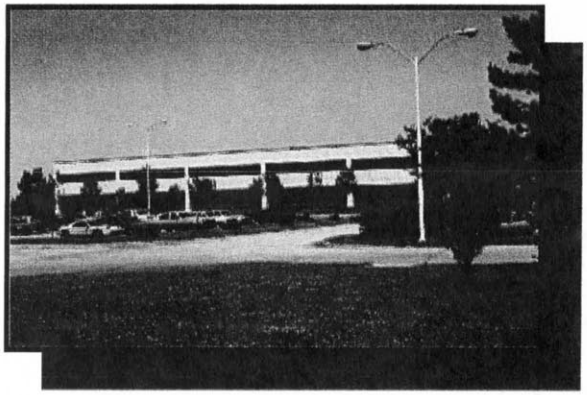
Veterinary Basic Science
Lincoln, NE



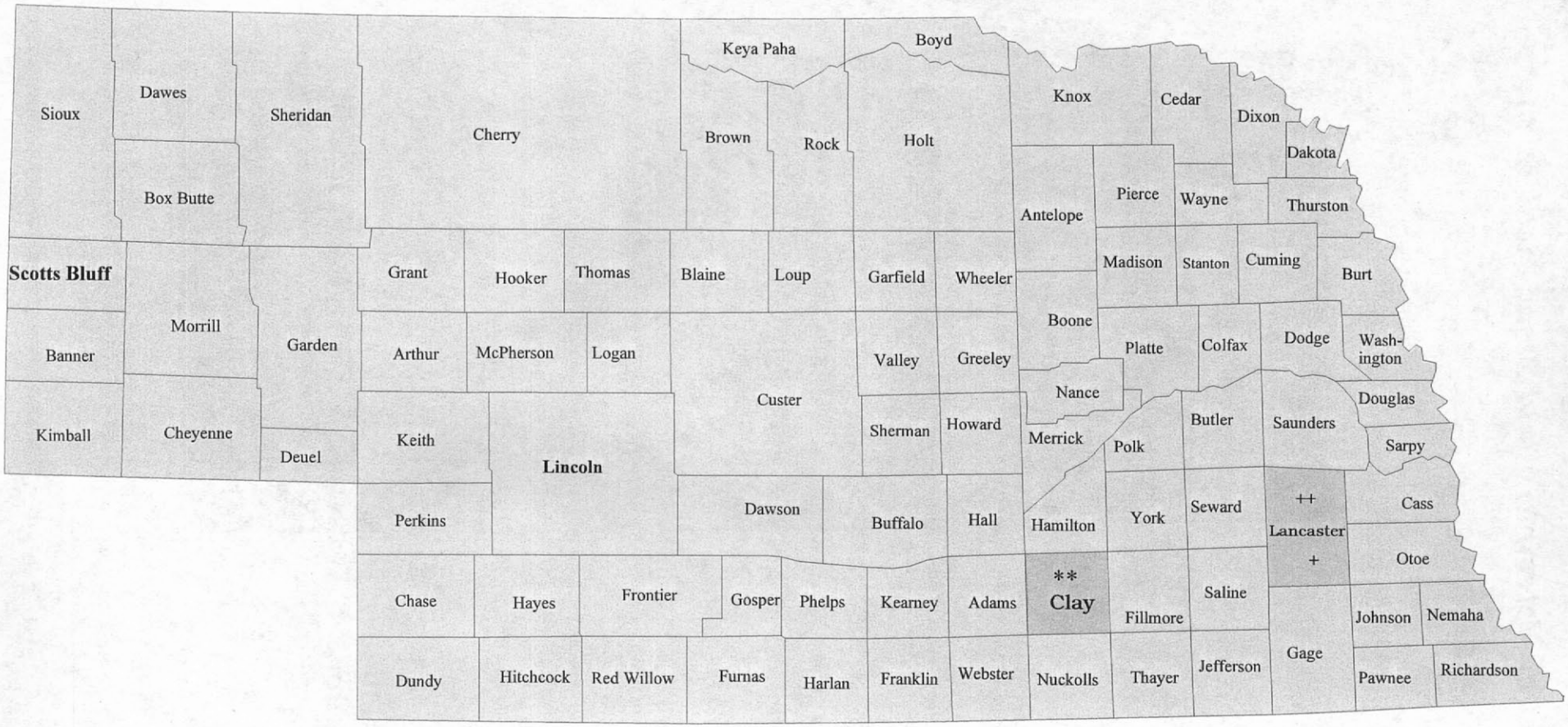
Veterinary Diagnostic Center
Lincoln, NE



Great Plains Veterinary
Educational Center
Clay Center, NE



STATE OF NEBRASKA



** Great Plains Veterinary Educational Center, Clay Center, NE

\+ Veterinary Science Complex, (Veterinary Basic Sciences, Veterinary Diagnostic Center, Animal Research Facility, Sewage Sterilization Plant and Animal Holding Facility)

++ UNL Agricultural Research and Extension Center, Mead, NE (VBMS Beef Cattle Herd)

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Department of Veterinary and Biomedical Sciences
2006 Personnel

Faculty

Barletta, Raúl G.,* BS, MS, PhD ..... Professor

Brodersen, Bruce W.*, BS, DVM, MS, PhD ..... Research Associate Professor

Carlson, Michael P., BS, MS, PhD ..... Lecturer

Das, Subash, DVM, MVS, PhD ..... Research Assistant Professor

Doster, Alan R.,* DVM, MS, PhD, ACVP ..... Professor

Duhamel, Gerald E.,* BS, DMV, PhD, ACVP ..... Professor

Fernando, M. Rohan, BS, MSc, PhD, MPhil ..... Research Assistant Professor

Griffin, D. Dee,* BS, DVM, MS ..... Professor

Hardin, David K.[1], DVM, Diplomat ACT ..... Professor, Dept. Head and Associate Dean ISU

Hardin, Laura E.,[1] DVM, MS, PhD ..... Coordinator/Senior Lecturer

Jones, Clinton J.,* BA, PhD ..... Professor

Kelling, Clayton L.,* BS, MS, PhD, DVM ..... Professor

Lou, Marjorie F.,* BS, MS, PhD ..... Professor

McVey, David S.[1], PhD, DVM ..... Associate Professor

Moxley, Rodney A.,* DVM, PhD ..... Professor

Osorio, Fernando A.,* MV, MS, PhD, ACVM ..... Professor

Pattnaik, Asit K.*, BS, MS, PhD ..... Professor

Paul, Prem S.*, BVSc, PhD ..... Professor, UN-L, Vice Chancellor for Research

Rogers, Douglas G.[2],* BS, DVM, MS, PhD ..... Professor and Interim Department Head

Rupp, Gary P.,* DVM, MS ..... Professor

Schmitz, John A.[2],* DVM, PhD, ACVP ..... Professor

Smith, David R.,* BS, DVM, PhD, ACVPM, ABVP ..... Associate Professor

Somerville, Greg A.*, PhD, MS, BS ..... Assistant Professor

Steffen, David J.,* BS, DVM, PhD, ABVP ..... Professor

Wohlers, Arden, BS, DVM ..... Extension Assistant Professor

Zhou, Joe Y., BSc, PhD ..... Research Associate Professor

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[1] Appointment Began in 2006 [2] Appointment Ended in 2006 *Graduate Faculty

VBMS Researchers, Postdoctoral Research Associates and Senior Research Associates, 2006

Barletta-Chaćon, Ofelia, ... Postdoctoral Research Associate
Jaroni, Divya,[2] BS, MS, PhD ..... Postdoctoral Research Associate
Kwon, Byungjoon[1], DVM, MS, PhD ..... Postdoctoral Research Associate
Peng, Weiping[2], BS, MS, PhD ..... Senior Research Associate
Sadykov, Marat R.[1], MSc, PhD ..... Postdoctoral Research Associate
Samrakandi, Mustapha M.[2], BS, MS, PhD ..... Researcher
Topliff, Christina L., BS, DVM, MS, PhD ..... Postdoctoral Research Associate
Xing, Kuiyi, BS, PhD ..... Senior Research Associate

Department of Veterinary and Biomedical Sciences
Adjunct and Courtesy Faculty, 2006

Campos, Manuel[*2], DVM, MS, PhD ..... Adjunct Associate Professor
Cirillo, Jeffrey D.[1]*, BA, PhD, MS ..... Adjunct Associate Professor
Chenoweth, Peter J.,* BVSc, PhD ..... Adjunct Professor
DeGroff, Terry, DVM ..... Adjunct Assistant Professor
Dewey, Catherine[*2], DVM, MS, PhD ..... Adjunct Assistant Professor
Donis, Ruben O.,* MV, PhD ..... Adjunct Professor
Fajt, Virginia R., DVM, PhD ..... Adjunct Instructor
Grotelueschen, Dale M.* , DVM, MS ..... Adjunct Professor
Hall, James E.[1,2] BS, DVM, MS ..... Adjunct Courtesy Professor
Hesse, Richard*, BA, MS, PhD ..... Adjunct Assistant Professor
Hodgson, Clague P.[2], BSc, PhD ..... Adjunct Associate Professor
Hungerford, Laura L.*[2], BS, DVM, PhH, PhD ..... Adjunct Associate Professor
Hunsaker, Beck D.,* BS, DVM, MS, PhD ..... Adjunct Assistant Professor
Kador, Peter*, BA, PhD ..... Adjunct Professor
Keen, James Edward, BS, BS, DVM, PhD ..... Adjunct Associate Professor
Laegreid, William, BS, MS, DVM, PhD ..... Adjunct Associate Professor
Larson, Robert L., BS, DVM, PhD ..... Adjunct Assistant Professor
Lechtenberg, Kelly F.[2]*, BS, DVM, PhD ..... Adjunct Assistant Professor
Loskutoff, Nadia, BS, MS, PhD ..... Adjunct Assistant Professor
Mosier, Derek, BS, DVM, MS, PhD ..... Adjunct Professor
McKown, Richard D., BS, DVM, MS, PhD ..... Adjunct Professor
Oestmann, Daniel J.[1,2], BS, DVM, PhD ..... Adjunct Courtesy Assistant Professor
Perino, Louis*[2], BS, DVM, PhD ..... Adjunct Associate Professor
Petro, Thomas,* BS, MA, PhD ..... Courtesy Professor
Pierce, Vern L.[2] PhD, MS, MS, BS ..... Adjunct Assistant Professor
Rock, Daniel*, BSE, PhD ..... Adjunct Associate Professor
Ross, Gary,[2] BS, DVM ..... Adjunct Assistant Professor
Sanderson, Michael, BS, DVM, MS ..... Adjunct Associate Professor
Sargeant, Janice Merrill , DVM, MSc, PhD ..... Adjunct Assistant Professor
Sherman, Gary B.,[2] BS, MS, DVM, PhD ..... Adjunct Courtesy Professor
Solheim, Joyce C.[2] BS, MA, PhD ..... Courtesy Assistant Professor
Spire, Mark F.,[2]* BS, DVM, MS ..... Adjunct Professor
Spitzer, John C., BS, MS, PhD ..... Adjunct Professor
Straw, Barbara E.[2]*, DVM, PhD ..... Adjunct Professor
Wach, Ricky Sue B., BA, DVM, MA ..... Courtesy Instructor
Wittum, Thomas[2]*, BS, MS, PhD ..... Adjunct Assistant Professor
Wood, Charles*, BA, MA, MPhil, PhD ..... Courtesy Professor
Wylie, Dwane[2]*, BA, PhD ..... Courtesy Professor
Zimmerman, Jeffrey J., BA, DVM, MS, PhD ..... Adjunct Associate Professor

[1]Appt began in 2006 ; **[2]Appt ended in 2006**

Emeriti Faculty

Dickinson, Earl,[3]* BS, DVM, PhD ..... Professor Emeritus
Erickson, E. Denis*, DVM, PhD, ACVM ..... Professor Emeritus
Frey, Merwin,* BS, DVM, MS, PhD ..... Professor Emeritus
Hogg, Alex,[3]* DVM, MS ..... Professor Emeritus
Johnson, Jerre L.,* BS, DVM, PhD ..... Professor Emeritus
Rhodes, Marvin,* BS, MS ..... Professor Emeritus
Rice, Duane, BS, DVM ..... Professor Emeritus
Schmitz, John A.[1],* DVM, PhD, ACVP ..... Professor Emeritus
White, R. Gene,* BS, DVM, MS ..... Professor Emeritus

[3] Deceased in 2006

Department of Veterinary and Biomedical Sciences
2006 Faculty and Staff Personnel
By Function and Unit

Department Administration Personnel

■Hardin, David K.[1], DVM, Diplomat ACT . . Professor, Dept. Head & Assoc. Dean 2+2 Program
Rogers, Douglas G.,[2] BS, DVM, MS, PhD . . . . . Professor and Interim Department Head
Albrecht, Roxann R. . . . . Accounting Clerk III
Gellatly, Rene K., BS . . . . . Administrative Team Manager
Haahr, Patricia K. . . . . Accounting Clerk II
Johnson, Lilo B. . . . . Staff Assistant
Martinez, Patsy A., AA . . . . . Staff Secretary III

Animal Care Program

■Douglas G. Rogers, BS, DVM, MS, PhD . . . . . Faculty Supervisor

ARF (Animal Research Facility), Lincoln, Nebraska

■Clowser, Blaine, BS . . . . . ARF Animal Operation's Manager
Grotrian, Bonita K.,[1] . . . . . Office/Service On Call Worker
Lytle, Kandy . . . . . Research Technician II
Tucker, Steve . . . . . Office/Service On Call Worker

VBMS/ARDC - (Agriculture Research and Development Center) Ithaca, Nebraska

Bergman, Benjamin . . . . . Agricultural Research Technician I
Justin Heldt . . . . . Office/Service On Call Worker

Pre-Veterinary Advising Center

■Steffen, David J., BS, DVM, PhD, ABVP . . . . . Advisor
Aerts, Alyse[2] . . . . . Peer Advisor
Fry, Pamela[2] . . . . . Senior Peer Advisor
Painter, Laura[2] . . . . . Peer Advisor
Malori Marotz[1] . . . . . Senior Peer Advisor
Lauren Taylor[1] . . . . . Peer Advisor
Kylie Wiedel[1] . . . . . Peer Advisor

Cataract Research

■Lou, Marjorie, PhD . . . . . Biomedical Biochemist, Professor
Chen, Chao-Wei (Kate)[2], BA, MS . . . . . PhD Student
Fernando, M. Rohan, BS, MSc, PhD, M.Phil. . . . . Research Assistant Professor
Wang, Yin, BS, MS . . . . . PhD Student
Xing, Kuiyi, BS, PhD . . . . . Senior Research Associate

Immunology Research

■TBA . . . . . Immunologist

Microbiology Research

■Barletta, Raúl, PhD ..... Bacteriologist, Associate Professor
Barletta-Chacón, Ofelia, MSc, MD, PhD ..... Postdoctoral Research Associate
Dogra, Harshdeep, BS, MS ..... PhD Student
Liu, Xiaofei, BS ..... PhD Student
Paulson, Avery[1], BS, MS ..... PhD Program
Zinniel, Denise, BS, MS ..... Laboratory Manager

■Duhamel, Gerald, DVM, PhD ..... Pathologist & Microbiologist, Professor
Gulzar, Ahmed, BVSc ..... MS Student
Liyanage, Namal,[1] BA ..... PhD Student
Martinsen, Angela M.[1] MS ..... Research Technologist
Navaratjme. Dhammika, BVSc ..... PhD Student
Risika, Jinadasa, BVSc ..... MS Student
Samrakandi, Mustapha[1], BSc, MSc, PhD ..... Researcher
Stryker, Cynthia ..... Research Technician III

■Moxley, Rodney, DVM, PhD ..... Pathologist & Bacteriologist, Professor
Bailey, Doreen, AS, MT (Asst BioSci) ..... Research Technician III
Bretschneider, Gustavo, DVM ..... PhD Student
Erume, Joseph, DVM, MS ..... PhD Student
Hansen, Karen, BA ..... Research Technician III

■Somerville, Greg A., PhD, MS, BS ..... Microbiologist, Assistant Professor
Jacobs, Erik, BS ..... (Biochemistry Major) PhD Student
Kramer, Devon P.[1], BS ..... PhD Student
Levorson, Erica ..... Undergraduate Student
Lucas, Melissa, BS ..... (Biochemistry Major) PhD Student
Zhu, Yefei,, MEDI, MSVc ..... PhD Student

Virology Research

■Jones, Clinton, PhD ..... Virologist, Professor
Geiser, Vicki,[2] BS, MS ..... PhD Student
Henderson, Gail, MA ..... Research Technologist I
Meyer, Florencia, BS MS (SBS) ..... PhD Student
Peng, Weiping,[2] BS, MS, PhD ..... Senior Research Associate
Perez de Bretschneider, Sandra[2], DVM, MS ..... PhD Student
Rose, Susanne[1] (SBS) ..... PhD Student
Saira, Kazima, BS, MS ..... PhD Student

■Kelling, Clayton, DVM, PhD ..... Virologist, Professor
Mori, Yuko, BS ..... MS Student
Topliff, Christina L., BS, DVM, MS, PhD ..... Postdoctoral Research Associate

■Pattnaik, Asit K., BS, MS, PhD ..... Professor
Ansari, Israrul H., BSc, MSc, PhD ..... Researcher
Das, Phani Bhusan[1], BVSc ..... PhD Student
Das, Subash C., BSVc, MVSc, PhD ..... Research Assistant Professor
Nayak, Debasis, BVSc, MVSc ..... PhD Student
Gil, Zhi Hong ..... Laboratory Assistant II
Martinsen, Angela M., MS[2] ..... Lab Manager/Research Technologist

■Osorio, Fernando MV, PhD ..... Virologist, Professor
Beura, Lalit[1], BVSc ..... PhD Student
Brito, Monica R., BS, MS ..... Laboratory Manager
de Lima, Marcelo, DVM, MS ..... Visiting Scholar
Hsu, Ching Hsin, BS ..... MS Student
Kwon, Byungjoon[2], DVM, MS ..... PhD Student
Kwon, Byungjoon[1], DVM, MS, PhD ..... Postdoctoral Research Associate
Oliveira, Marilia[2], DVM ..... MS Student
Subramaniam, Sakthivel[1], BVSc, MVSc ..... PhD Student

Research Support Glassware Preparation Laboratory

■Barletta, Raúl[1], PhD ..... Bacteriologist, Professor
Duhamel, Gerald,[2] DVM, PhD ..... Pathologist & Microbiologist, Professor
Nilson, David[2] ..... Lab Assistant II
Rajagopol, Janaki ..... Lab Assistant II

UNL Core Microscopy Facility - Beadle Center

Zhou, You (Joe), BSc, PhD ..... Director, UNL Core Microscopy Laboratory

Veterinary Epidemiology Research

■Smith, David, DVM, PhD, ACVPM, ABVP ..... Faculty Supervisor, Extension
Clowser, Sharon, BS ..... Extension Assistant
Oliveira, Marilia[1], DVM, MS ..... Extension Assistant
Paulson, Avery[1], BS, MS ..... PhD Program

Extension

Clowser, Sharon, BS ..... Extension Assistant, Lincoln
Griffin, Dee, DVM, MS ..... Feedlot Cattle, GPVEC
Smith, David, DVM, PhD ..... Dairy and Beef Cattle Veterinarian, Lincoln

Nebraska Veterinary Diagnostic Laboratory System - Lincoln, North Platte, Scottsbluff

■Rogers, Douglas G.,[2] BS, DVM, MS, PhD ..... Interim Executive Director
Steffen, David DVM, PhD ..... Director, VDC Lincoln

Veterinary Diagnostic Center (VDC) Office Personnel

■Steffen, David, DVM, PhD ..... Director
Ellis, Roxane L., BS ..... Specialist
Henning, Donna J. ..... Clerical Assistant III
Laws, Lenora L. ..... Clerical Assistant III
Seelmeyer, Mavis C. ..... Staff Secretary III

Bacteriology

■McVey, David S.[1], PhD, DVM ..... Microbiologist/Bacteriology, Associate Professor
Bauman, Jamie ..... Research Technician III
Combs, Recky S. ..... Research Technician III
Gehers, Angela ..... Research Technician III
Jaroni, Divya,[2] BS ..... Postdoctoral Research Associate

Koelling-Kombs, Becky ..... Research Technician III
Kuszak, Jennifer, BS ..... Laboratory Specialist
Lin, Qin ..... Research Technician III
Mosier, Trissa[2] ..... Research Technician III
Olsen, Cassandra J. ..... Research Technologist
Pike, Laura G. ..... Research Technician III
Royal, Deb, AS, BS ..... Laboratory Manager
Williams, Patrick D.[2] ..... Research Technician III

Glassware Preparation Lab

Heyer, Mary ..... Lab Assistant III

Histology

▪Doster, Alan, DVM, PhD ..... Faculty Supervisor
Braderic, Marijana ..... Histological Technician III
Claussen, Pat, CDA ..... Research Technician II
Fields, Rosa M. ..... Histological Technician III
Johns, LaVonne, HT ..... Histotechnician III
Olmscheid, Robin, HT ..... Laboratory Supervisor
Premaratnemenike, Kalyani, BSc ..... Histopathology Technician III

Necropsy

▪Doster, Alan, DVM, PhD ..... Pathologist, Faculty Supervisor
Grossman, Sharon ..... Research Technician III
Riggert, Christen, BS, AS ..... Research Technician III

Pathology

▪Doster, Alan, DVM, PhD ..... Pathologist
Brodersen, Bruce, DVM, MS, PhD ..... Pathologist
Henningson, Jamie, BS, DVM ..... PhD Student
Rogers, Douglas, DVM, PhD ..... Pathologist
Nabity, Paul[2] ..... MS Student
Schmitz, John A.[2], DVM, PhD, ACVP ..... Pathologist
Steffen, David, DVM, PhD ..... Pathologist

Toxicology

▪Carlson, Michael, PhD ..... Diagnostic Toxicologist/Analytical Chemist
Rajurkar, Sanju, MS ..... Research Technician II

Virology

▪Osorio, Fernando A.[2], MV, MS, PhD ..... Virologist, Faculty Supervisor
▪Kelling, Clayton L.[1], DVM, PhD ..... Virologist, Professor; Faculty Supervisor
Braswell, Steve, AA, BS ..... Research Technician III
Dabydeen, Fredrick N. ..... Laboratory Assistant II
Frink-Kotschwar, Stephaine K. ..... Research Technician III
Galeota, Judi, BS ..... Laboratory Manager
Lin, Qin ..... Research Technician III
McCoy, Shannen, BS ..... Research Technician III

Moural, Timothy W., BS ..... Research Technician III
Russ, Julia A. ..... Research Technician III
Wagner, Angela, BS ..... Research Technician III
Xie, Liping, MD ..... Assistant Laboratory Manager

Quality Assurance Program

Pedersen, Marci[2], BS, MA ..... Quality Assurance Manager
Martinsen, Angela M.,[1] MS ..... Quality Assurance Manager

Great Plains Veterinary Educational Center (GPVEC) Clay Center, Nebraska

▪Rupp, Gary, DVM, MS ..... Director & Professor – Beef Cattle
Hermesch, Dennis, BS, DVM ..... MS Student
Kramer, Rolland, BS, DVM ..... MS Student
Reece, Thomas, BS, DVM ..... MS Student
Dana, Ramona ..... Custodian II
Ellis, Roger,[1,2] BS, DVM, MS ..... Lecturer
George, Debbie ..... Staff Assistant
Griffin, D. Dee, DVM, MS ..... Professor – Beef Cattle Extension Feedlot Veterinarian
Brockway, Willliam,[2] BS, DVM ..... MS Student
Johnson, Steve E., BA ..... Systems Analyst
Shuck, Karen K., CVT ..... Veterinary Technician, Agricultural Research Technician II

Department of Veterinary and Biomedical Sciences
2006 Honors, Awards and Recognitions

University of Nebraska Awards

Graduate Student Awards

Jamie Henningson and Namal M. Liyanage received the Milton E. Mohr Fellowship from the University of Nebraska-Lincoln, Center for Biotechnology

Lalit Beura received the Chancellor's Doctoral Fellowship, University of Nebraska-Lincoln, awarded by the Department of Veterinary and Biomedical Sciences, Office of Graduate Studies

Debasis Panda received one of the highest awards, the Othmer Fellowship, University of Nebraska-Lincoln, Office of Graduate Studies

Gustavo Bretschneider received the Shear-Miles Fellowship from the University of Nebraska-Lincoln, Institutute of Agriculture and Natural Resources, Agricultural Research Division and College of Agricultural Sciences and Natural Resources

Dhammika Navarathna received the Shear-Miles Agricultural Endowed Scholarship/Fellowship Award through the University of Nebraska-Lincoln, University Foundation, Institutute of Agriculture and Natural Resources, Agricultural Research Division

Joseph Erume received the Widaman Trust Distinguished Graduate Assistant Award through the University of Nebraska-Lincoln, Institutute of Agriculture and Natural Resources, Agricultural Research Division

Vicki Geiser received recognition for her excellence in a research presentation at the April 2006 Research Fair sponsored by the University of Nebraska-Lincoln, Office of Research and Graduate Studies

National and Regional Awards

Faculty Awards

Dr. Gary P. Rupp, Professor and Director at the Great Plains Veterinary Educational Center, received the American Association of Bovine Practitioners—Merial Beef Preventive Medicine Award at the 39th Annual Convention, September 21-23, 2006

Dicky Dee Griffin received the American Association of Bovine Practitioner's Award of Excellence from the University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences

Marjorie F. Lou received an Adjunct Professorship from China Medical University, Shenyang, China, and received the Kwan-Biao Distinguished Professorship from Zheijiang University, Hangzhou, China. She has also received a "Certification of Recognition" for Contributions to Students from the University of Nebraska-Lincoln

Marcelo de Lima, Visiting Scholar from The School of Veterinary Medicine of the Federal University of Santa Maria, Brazil, received a First Place Award for the best Immunology Oral Presentation at the 3rd International Symposium on PRRSV and at the Conference of Research Workers in Animal Disease, Chicago, IL, December 1-5, 2006

Staff Awards

Judi Galeota received the Outstanding Employee Award for Managerial/Professional Staff in the Institute of Agriculture and Natural Resources for the period of May/June 2006

Lilo B. (Lee) Johnson received the Outstanding Service to Graduate Education Award, University of Nebraska-Lincoln, Office of Graduate Studies

VBMS Departmental Awards

Yuko Mori, MS Candidate and Kazima Saira, PhD Candidate, received the Best Seminar Award from the Department of Veterinary and Biomedical Scienes, University of Nebraska-Lincoln

2006 University of Nebraska Service Awards

5 Years	15 Years	20 Years	25 Years	30 Years
M. Rohan Fernando	Raul Barletta	Roxann Albrecht	Romona Dana	Clayton Kelling
David Nilson	Dicky Dee Griffin	Gerald Duhamel		Rene Gellatly
Weiping Peng		Steve Johnson		Cynthia Stryker
Christen Riggert		Lilo Johnson		

UNDERGRADUATE STUDENTS
2006 DEAN'S LIST

Veterinary Sciences Majors, Spring 2006

Donna M. Bader	Lindsey A. Hofman	Jordan J. Bader
Kathryn A. Kasten	Emily A. Dritley	Sara B. Schuessler
Katie L. Franson	Lauren C. Taylor	Pamela R. Fry
Ashley N. Vanderheiden	Cody J. Hankins	Daniel J. Woodbury

Veterinary Science Majors, Fall 2006

Elizabeth Farrow	Malori Marotz	Jennafer Glasesemann
Sara Schuessler	Megan Hiatt	Lauren Taylor
Lindsey Hofman	Abby Van Hoef	Kathryn Kasten
Daniel Woodbury	Kelsey Kerwin	Jennifer Woods
Ryan Koopmans		

Undergraduate Women in Science Honorees, 2006

Jennafer Glaesmann

Amy Martin

University of Nebraska-Lincoln Undergraduate Awards

Undergraduate Student Awards

Holly Samson received the graduate student recruitment nomination award for the William J. Curtis Endowed Fellowship, University of Nebraska-Lincoln, College of Agriculture Science and Natural Resources

Jennafer Glaesemann, Animal Science, received the Outstanding Undergraduate Women Achievement in Science Award, University of Nebraska-Lincoln, Center for Science, Mathematics & Computer Education

Elizabeth Farrow, Veterinary Medicine DVM Program, was awarded the Nebraska Veterinary Medical Association Pre-Vet Scholarship, while a student at University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences, College of Agricultural Sciences and Natural Resources

Amy Martin, Animal Science, Veterinary Medicine/DVM Program, received the Charles William Yount Education Award in Veterinary Medicine through the University of Nebraska-Lincoln, University Foundation, Department of Veterinary and Biomedical Sciences

2006-2007 VBMS Committee Assignments
Department of Veterinary Biomedical Science

Name	Appointment Term	
	Begin	End
Peer Review Committee (3-Yr Member Appt/1-Yr Chair)		
Gary Rupp (Chair/October 06 - September 07)	October, 2006	September, 2009
Gerald E. Duhamel	October, 2002	September, 2008
Fernando Osorio	September, 2006	September, 2009
Douglas Rogers	July 2004	July 2007
Raúl G. Barletta	November, 2005	October, 2008
VBMS-IBMS Graduate Committee (3-Yr Appt)		
Gerald E. Duhamel (Chair, Nov. 05/Sept 08)	November, 2003	September, 2008
Greg A. Somerville	October, 2005	September, 2008
Raúl G. Barletta	August, 2004	August, 2007
Clayton L. Kelling	August, 2004	August, 2007
Rodney A. Moxley	August, 2004	August, 2007
Lee Johnson (Secretarial Support)	--	Indefinite
Safety Committee		
Raúl G. Barletta (Chair, VBS)	September, 1999	August, 2002
Robin Olmsheid (VDC)	September, 1998	August, 2004
Kandy Lytle (ARF)	February, 2003	August, 2006
Doreen Bailey (VBS/Technician)	September, 2000	August, 2003
Douglas G. Rogers (VDC)	September, 1999	August, 2002
Donna Henning (Secretarial Support/VDC)	July, 1996	Indefinite
Veterinary and Biomedical Science Undergraduate Student Research Coordinator		
Gerald E. Duhamel	November, 2002	Indefinite
Seminar, Chairman		
Greg A. Somerville	November, 2005	October, 2008

Name	Appointment Term	
	Begin	End
George A. Young Swine Conference Planning Committee		
Bruce W. Brodersen (Chair, UNL/VDC)	January 2006	January 2007
Tom Buelt, Pfizer Animal Health	January 2006	January 2007
Larry Germer, Extension Educator, Gage County	January 2006	January 2007
Phil Hardenburger, NVMA, Crete Veterinary Clinic	January 2006	January 2007
Mike Brumm, UNL, Northeast Research & Ext Ctr	January 2006	January 2007
Jim Unwin, Veterinarian, Red Barn Veterinary Clinic	January 2006	January 2007
Jeff Husa, Boehringer Ingelheim Vetmedica, Inc.	January 2006	January 2007
Dave Hansen, Producer	January 2006	January 2007
Ron Brodersen, Hartington Whole Hog Health Center	January 2006	January 2007
Sharon Clowser, Conference Coordinator	-	Indefinite
Department Curriculum Committee		
David J. Steffen (Chair, August 2005)	August, 2003	Indefinite
Bruce W. Brodersen	October, 2004	Indefinite
Michael P. Carlson	August, 2005	Indefinite
Clayton L. Kelling	September, 2000	Indefinite
Rodney A. Moxley	August, 2006	Indefinite
Nebraska Veterinary Student Admission Committee		
Bruce W. Brodersen (Chair, UNL/VDC)	August, 2001	Indefinite
Gary P. Rupp (NU/GPVEC)	August, 2002	Indefinite
Jeff Keown (UNL/Animal Science Dept)	July, 2006	June, 2007
Don Drapper (ISU/Administration)	July 2005	Indefinite
Ted Evans (NVMA Rep/Vet/Adams Animal Care, Inc)	January 2006	January 2007
Jess Hinrichs (NVMA Rep/Sutton Vet Clinic)	January 2007	January 2008
Kathy Kuehl (ISU/Coordinator of Admissions)	January 2005	Indefinite
Monica Howard (ISU/Director of Student Programs)	July 2005	Indefinite
Mavis Seelmeyer (UNL Secretarial Coordinator)	–	Indefinite
Departmental Computer Support Designee and Liaison to IANR Computing		
Roxane Ellis	1990	Indefinite
CASNR Curriculum Committee (2-yr term) **(Veterinary and Biomedical Sciences; Biochemistry and Food Science and Technology Departments)**		
Clinton J. Jones	August, 2006	May, 2008
University of Nebraska-Lincoln – ISU/CVM Curriculum Committee		
Rodney A. Moxley	November, 2006	
CASNR Faculty Advisory Council (2-yr term)		
Raúl G. Barletta	July, 2005	June, 2007
Pre-Veterinary Club Advisor		
Douglas G. Rogers, Advisor	May, 2004	Indefinite
David R. Smith, Co-Advisor	May, 2004	Indefinite

Name	Appointment Term	
	Begin	End
ARD Advisory Council (3-yr term) **(District 5 -- Department of Statistics, Entomology and Veterinary and Biomedical Sciences)**		
Lance Meinke (Statistics)	May, 2005	April 2008
Institutional Animal Care and Use Committee		
Gerald E. Duhamel, Department Representative Fernando A. Osorio, Alternative Member	January, 2000 January, 2006	December 31, 2008 December, 2006
Institutional Biosafety Committee		
Rodney A. Moxley	January, 2006	December 2008
VBMS Husker Harvest Days Committee		
Michael P. Carlson, Chair Clayton L. Kelling D. Dee Griffin David J. Steffen	June 2002 June 2002 June 2002 June 2002	Indefinite Indefinite Indefinite Indefinite
UNL Radiation Safety Committee		
Raúl G. Barletta	February, 2000	Indefinite
VBMS Representative to UNL Library		
Raúl G. Barletta	2000	Indefinite
VBMS Website Oversight Committee		
Fernando A. Osorio Raúl G. Barletta Bruce W. Brodersen David R. Smith Rodney A. Moxley Roxane Ellis, Technical Support	February, 2003 February, 2003 February, 2003 February, 2003 February, 2003 February, 2003	Indefinite Indefinite Indefinite Indefinite Indefinite Indefinite

DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES

FACULTY PROFILES

Raúl G. Barletta, BS, MS, PhD
Professor

Bacterial Pathogenesis/Drug Resistance/
Mycobacteria/Tuberculosis
Department of Veterinary and Biomedical Sciences

Appointment: 0.90 Rsch; 0.10 Tchg

The main focus of my laboratory is the study of bacterial pathogens including *Mycobacterium tuberculosis, Mycobacterium avium* subsp. *paratuberculosis* and related pathogens. In this area, the major long-term goals in my laboratory are: 1) to understand virulence and drug- resistance mechanisms in pathogenic mycobacteria, and 2) to develop molecular tools to diagnose and control mycobacterioses.

Drug resistance studies in mycobacteria have focused on the molecular targets of peptidoglycan synthesis inhibitors. We have identified the molecular targets for D-cycloserine. One of these targets is the enzyme D-alanine racemase, involved in the initial steps of peptidoglycan biosynthesis. Furthermore, we have shown that overproduction of D-alanine racemase in mycobacteria underlies the D-cycloserine resistance phenotype of resistant mutant strains. The specific molecular mechanism responsible for the overproduction of this enzyme was shown to be a promoter-up mutation in the control region of the D- alanine racemase gene. We have also studied related enzymes involved in D-alanine metabolism including L-alanine dehydrogenase and D-alanine ligase. We plan to study the essentiality of these genes in the context of drug design and vaccine development in *M. tuberculosis.*

M. paratuberculosis is the causative agent of Johne's disease, a wasting chronic enteritis affecting all ruminants.. We have developed a genetic system for *M. paratuberculosis* that includes phage infection, plasmid transformation, and transposon mutagenesis. We have identified several attenuated strains from a mutant bank. In collaborative studies, we are testing these mutants in animal models including mice and baby goats. In addition, we have identified and characterized *M. paratuberculosis* secreted and cellular immunogenic proteins. From these molecular studies, a practical application test to measure the susceptibility of *M. paratuberculosis* to antimicrobial agents was developed. These steps are essential prerequisites for the understanding of pathogenesis, and the development of anti microbial therapies and new and more effective vaccines compatible with diagnostics.

My teaching responsibilities include serving as co-instructor for the courses VBMS 951 Advanced Molecular Infectious Diseases and VBMS 424/824 Basic Molecular Infectious Diseases. I advised seven MS and three PhD graduate students who have completed their degrees. I served as co-advisor for 2 MS graduate students who completed their degrees.

Bruce W. Brodersen, DVM, MS, PhD
Research Associate Professor

Pathologist
Veterinary Diagnostic Center

Appointment: 1.00 Diagnostic Service

My position was created out of a need for more pathologists at the Veterinary Diagnostic Center. The increased need was a result of continual increase in the numbers of case submission. Existing faculty at the Diagnostic Center were not able to meet other commitments as a result of the elevated case load. Funding for my position comes entirely from revenues generated by submission fees received at the Diagnostic Center.

My efforts are directed at coordination of appropriate testing of samples submitted to the Diagnostic Center, assimilating test results for determining a diagnosis, and generating a suitable report to the submitting veterinarian or owner. The range of species that samples originate from is wide and consists mainly of food animals and companion animals with avian species as well as wild and or exotic and aquatic species. I also supervise the contract with the USDA for testing of samples for scrapie in sheep and chronic wasting disease in deer.

I have no formal research FTE, but I am conducting projects which are directed at investigating diseases of cattle. Currently my projects concentrate mainly on bovine viral diarrhea virus (BVDV). One of these studies includes detection of cattle persistently infected with BVDV. I am collaborating with researchers at Auburn University, investigating the role of BVDV as a reproductive disease in cattle.

Michael P. Carlson, MS, PhD
Lecturer

Diagnostic Toxicologist/Analytical Chemist
Veterinary Diagnostic Center

Appointment: 85% Diagnostic, 15% Teaching

I serve as a diagnostic toxicologist for the VDC. I review cases submitted for toxicology services, obtain case histories as needed, interpret diagnostic toxicology results, write final toxicology reports for diagnostic cases and report results to case submittors or VDC diagnosticians. I also consult with veterinarians, clients and university faculty and staff about toxicology and analytical services.

I also serve as an analytical chemist for the VDC Toxicology Laboratory. I manage the operation of that laboratory; select and validate methods for analytical services; supervise, train and manage the staff of that laboratory; and assist with performance of analytical services as required.

I teach VBMS 410 – Introduction to Pharmacology and Toxicology, a 4-credit hour, integrated studies course required for Veterinary Science undergraduate majors. The course is intended to introduce students to basic principles of drug action and toxic effects of chemical substances. The course also emphasizes written and oral communication skills. Students are required to write a position paper on a controversial pharmacology or toxicology topic and present their position orally to the class. It is offered annually each fall semester.

My research interest is nitrate toxicosis in cattle, especially chronic nitrate exposure related to abortions.

I also am interested in the application and implementation of international standards for laboratory certification to veterinary diagnostic laboratories.

Subash Das, BSVc, MVSc, PhD
Research Assistant Professor

Veterinary Molecular Virologist
Center for Virology and
Department of Veterinary and Biomedical Sciences

Appointment: 1.00 FTE Research

My research includes the studies on viral gene expression and vaccine design using RNA viruses. The two viruses I am studying are vesicular stomatitis virus (VSV), a non-segmented negative-strand RNA virus and porcine reproductive and respiratory syndrome virus (PRRSV), a non-segmented positive-strand RNA virus. Due to its simple genome organization VSV has served as an attractive model to study the gene expression in negative-stranded RNA viruses. Understanding the mechanism of gene expression and its regulation is essential to identifying unique virus-specific targets for therapeutic interven-tion in controlling infection. More specifically I am looking at the role of VSV phosphoprotein P in viral transcription, replication and assembly of infectious virus particles. Phosphoprotein of VSV is a multifunctional protein which is an essential subunit of viral polymerase. Using reverse genetics I have demonstrated that phosphorylation at specific residues within the P protein of VSV regulates the activities of the viral RNA-dependent RNA polymerase in transcription and replication and plays a major role in the life cycle of VSV. Using transposon-insertion and deletion mutagenesis we recently found out that the hypervariable hinge region of VSV P protein plays an important role in viral RNA synthesis and assembly of infectious particles. At present we are mapping out the individual amino acids in the hypervariable region of P that is required for virus assembly. Currently efforts are being made to establish a yeast-two-hybrid system to identify the cellular/ viral factors involved in the assembly of VSV. We are further planning to investigate the role of nucleotide sequences within the viral genome that control encapsidation, transcription and replication processes.

We have made use of our recent finding that the hypervariable region of VSV P protein can tolerate insertion of 19 amino acids with minimal effect on P protein activity. This has led us to produce a fluorescently labeled VSV with the eGFP inserted at the hypervariable region of P protein. Using this green virus we are investigating the transport of viral nucleocapsids by time lapse microscopy. This has allowed us to track the movement of individual nucleocapsids in infected cells. We have demonstrated that microtubules play an important role in the transport of VSV nucleocapsids from the site of synthesis to the site of assembly and mitochondria may play a role in this process. Several leads in this direction include single-particle tracking of viral nucleocapsids, multicolor live-cell imaging of ribonucleoprotein complexes and identification of microtubule motors involved in the transport.

Another aspect of my work has been the development of viral vaccines by genetic manipulations. At present I am using VSV as a vector to express porcine respiratory and reproductive syndrome virus (PRRSV) glycoproteins to study the immunogenicity of these proteins in animals. Recombinant VSVs expressing PRRSV GP5 and M proteins have been recovered by reverse genetics. Using these recombinant viruses we further plan to study the mechanism of entry and tissue tropism in PRRSV infection. Animal experiments are also being carried out for testing these recombinant viruses for generation of humoral and cell-mediated immune responses against PRRSV and to explore the possibility of using them as vaccines for the prevention of PPRSV infection.

Alan R. Doster, DVM, MS, PhD, ACVP
Professor

Pathologist
Veterinary Diagnostic Center

Appointment: 100% Diagnostic Service

I serve as a Diagnostic Pathologist in the VDC and rotate necropsy duty on a regular basis with other pathologists. We are responsible for the gross examination of various species, histological examination of tissues from necropsies and surgical biopsies; requesting and interpretating results from the bacteriological, serological, virological, toxicological tests which are part of the laboratory work-up; and establishing a diagnosis or rendering an opinion regarding each case. I spend a considerable amount of time on the telephone consulting with veterinarians and livestock owners regarding clinical histories, case submissions, and results of diagnostic testing. I have served as an expert witness many times for legal proceedings or insurance inquiries, the largest being in excess of $20 million. I have acted as a consultant for United States Department of Agriculture regarding foreign veterinary diagnostic laboratory capabilities.

I have no formal teaching FTE, but have served as the faculty coordinator for VBMS 901 (Diagnostic Techniques) and have taught several advanced pathology courses for pathology residents and graduate students. In addition, I have served as major advisor for master's and doctoral students and am a member of several graduate supervisory committees in the Department.

My research interests consist of infectious diseases of cattle and swine. I have been active in pursuing emerging disease syndromes initially seen in the VDC such as porcine reproductive and respiratory syndrome virus (PRRSV) and porcine circovirus infection. The PRRSV project led to the development of a commercially available PRRSV vaccine. I and the other pathologists serve primarily as consultants in a team-oriented approach to research problems where each member of the team contributes his area of expertise to the project. Other faculty in the Department who have major research appointments act as project leaders and request our assistance as necessary.

Gerald E. Duhamel, DMV, PhD, ACVP
Professor

Molecular Microbial Pathogenesis
Department of Veterinary and Biomedical Sciences

Appointments: .80 FTE Rsch; .10 Tchg; .10 Serv

My long-range goal is to define basic mechanisms of host-parasite interactions, and their relationship to susceptibility or resistance against disease, particularly within the framework of enteric diseases caused by bacteria and viruses. Presently, I am engaged in basic and applied biomedical research aimed at characterizing molecular mechanisms of microbial pathogenesis and host defense with practical applications to diagnosis and control of enteric diseases of animals and human beings. Specifically, I am investigating the biology of polymicrobial interactions in inflammatory bowel diseases caused by *Brachyspira pilosicoli*, a newly discovered pathogenic intestinal spirochete, enterohepatic *Helicobacter* and *Campylobacter* species of human and animals, and *Lawsonia intracellularis*, an obligate intracellular bacterium that causes proliferative enteropathy in non-human primates and animals.

Also, I am investigating the role of heterotypic immunity in protection against intestinal disease caused by group A rotaviruses, a major cause of diarrheal disease in human infants and animals. Current research addresses bacterial virulence factors and model development of intestinal injury and repair, phenotypic and genotypic bases of microbial pathogenesis, development of molecular methods for diagnosis of enteric diseases and control using subunit and recombinant vaccines.

M. Rohan Fernando, BS, MS, MPhil, PhD
Research Assistant Professor

Biochemist

Appointment: 1.00 FTE Research

Cataract is the major cause of blindness around the world. Age related cataract or senile cataract is the most common type of cataract. The normally transparent lens of the eye becomes cloudy in cataract. Oxidative stress which is induced by reactive oxygen species (ROS) has long been implicated in senile cataract formation. ROS molecules are generated in the lens either endogenously by enzyme systems or exogenously from the environment. ROS molecules produced through these processes in the lens are neutralized by antioxidants and ROS neutralizing enzyme systems in the lens. Even in the presence of these powerful antioxidants and ROS neutralizing enzyme systems, some ROS molecules get through these defense systems and oxidatively damage cellular molecules such as proteins, lipids and nucleic acids. Oxidation of lens proteins leads to lens opacification and cataract formation. Hence lens is also equipped with enzyme systems that can repair such oxidatively damaged proteins and other molecules. I have focused my research on the characterization of the repair systems in the lens.

1. Functions of thioltransferase-1

Thioltransferase-1 is a thiol/disulfide exchange enzyme. It is located in cytosol and has dethiolation activity in the lens. It can repair oxidatively modified lens proteins using its dethiolation activity. In addition to that we have shown that thioltrasferase-1 has ascorbic acid recycling ability. Human lens contains 2-3 times higher concentration of ascorbic acid as compared to other human tissues. Ascorbic acid functions as an antioxidant and its oxidation product dehydroascorbic acid is highly toxic and has been implicated in human cataract formation. Hence lens must have a mechanism to regenerate ascorbic acid. We have shown that thioltransferase is responsible for ascorbic acid recycling in human lens epithelial cells. We have also investigated the induction of thioltransferase-1, thioredoxin and thioredoxin reductase in pig lens under oxidative stress and found that all three enzymes are induced under the given oxidative stress conditions in an attempt to rescue the lens from the oxidative insult so that the clarity of the lens would not be affected by the give stress.

2. Thioltransferase-1 knockout mice

Primary cultures of mouse lens epithelial cells obtained from wild type mouse and thioltransferase-1 knockout mouse are used to compare the sensitivity of the these two cell types to oxidant stress. We are comparing the oxidative damage caused by oxidants in these two cell types using parameters such as marker enzyme activities, glutathione level, cell viability and cell proliferation.

3. Functions of thioltransferase-2

Thioltransferase-2 is the nuclear and mitochondrial isoform of thioltransferase-1. We are investigating the functions of this enzyme in nucleus and mitochondria. Thioltransferase-2 has dehydroascorbate reductase activity, ascorbate free radical reductase activity as well as peroxidase activity. Investigations are under way to elucidate how these functions of this enzyme are important to maintain the integrity of mitochondria and nucleus.

Dicky Dee Griffin, BS, DVM, MS
Professor

Pathologist and Nutrition
Department of Veterinary and Biomedical Sciences
Great Plains Veterinary and Educational Center, Clay Center, NE

Appointment: .50 FTE Tchng; .30 FTE Ext; .20 FTE Service

I am responsible for creating and coordinating veterinary medical education opportunities in feedyards. Through my extension appointment, I am responsible for conducting applied field research that relates to feedlot production management and beef safety. I am also responsible for disseminating production management information to the beef feedlot industry. Through my service commitment I provide a substantial portion of the veterinary medical service to the MARC feedlot. I also act as a consulting veterinarian to Nebraska feedlot veterinarians and other feedlot specialists. Through these contacts, I am able to provide unique educational opportunities to fourth-year veterinary students, veterinary technician students and animal science students.

The crux of my research involves management and production with an emphasis on creating or perfecting techniques that can be of direct benefit to the feedlot industry. I have a passionate interest in beef quality assurance (BQA) and a portion of my research focuses on developing and evaluating pre-harvest techniques that will help guarantee the wholesomeness of the beef supply in the United States. Developing and disseminating pre-harvest HACCP techniques for use in beef feedlots has become a major effort. I recognize the economic need for the beef cattle industry to present consumers with a consistently high quality product. I communicate this information to feedlot veterinarians, feedlot producers and potential consumers through my extension. This involves poster displays at trade shows, invited presentations and through GPVEC's Internet BQA home page. I always include BQA as a part of the focus of my consulting work. Food safety, including pre-harvest HACCP, residue avoidance and minimizing injection site blemishes is always a part of the feedlot teaching curricula at GPVEC.

Inter-departmental or Inter-institutional Cooperative Activities

Cooperator	Cooperative Activity
KSU, Other Colleges of Veterinary Medicine	Electives
Industry representatives and Academicians	Continuing Education Seminars
KSU (1st yr Students)	Fundamentals of Food Animal Practice
Joe Bek (NCTA)	Feedlot Technical Elective
Joe Bek (NCTA)	Feedlot Employee Safety Training Workshop
TJ Klopfenstein, E Erickson (UNL AnSci Dept)	Undergraduate Feedlot Health
TJ DeGroff (Practitioner, Burwell, NE)	Training Students
MARC Scientists	Research Projects
Assigned UNL Faculty	ExpoVision/High School Careers Workshop
Assigned UNL Faculty	UNL Youth Leadership Workshop

Clinton J. Jones, BA, PhD
Professor

Molecular Virologist

Appointment: 0.90 Rsch, Tchg. 0.10

Statement of Current Research Activities

1. a -Herpesvirus latency

Latency of a-herpesviruses is the focus of research in my laboratory. Bovine Herpes Virus 1 (BHV-1) and Herpes Simplex Virus 1 (HSV-1) are being used to study virus host interactions. BHV-1 is a significant viral pathogen of cattle that can induce respiratory disease, abortion, or occasionally encephalitis. BHV-1 is also a causative agent of "Shipping Fever" or Bovine Respiratory Complex. As a consequence of the pathogenic potential of BHV-1, the cattle industry suffers more than $500,000,000/year in losses. HSV-1 causes a variety of clinical symptoms, is the leading cause of corneal blindness due to an infectious agent, and appears to be a cofactor in Alzheimer's disease. Approximately 99% of all human beings are infected with HSV-1. a-Herpesviruses infect epithelial cells of the upper respiratory tract or the genital tract. Extensive viral gene expression occurs, virus is shed, and clinical symptoms are apparent. Virus enters the peripheral nervous system, trigeminal ganglia or sacral ganglia, where it establishes a latent infection in neurons. Viral DNA can persist in a latent state for the lifetime of the infected host or periodically reactivate. Only one small region of the BHV-1 genome is transcriptionally active in latently infected neurons, the latency related (LR) gene. HSV has a similar gene; the latency associated transcript (LAT). A latent infection can be divided into 3 distinct stages: 1) establishment 2) maintenance and 3) reactivation of latent virus. Reactivation can cause recurrent disease and regardless of the clinical outcome promotes virus transmission. Thus, latency is crucial for pathogenesis and is required for virus transmission.

LR gene products and LAT inhibit apoptosis (programmed cell death) in transiently transfect cells, and in trigeminal ganglia (TG) of infected calves or rabbits respectively. Based on these studies, we hypothesize that LR gene products and LAT promote survival of infected neurons. Future studies will identify the mechanism by which LR gene products and LAT inhibit apoptosis.

2. Regulation of productive infection by bICP0

Bovine herpesvirus 1 (BHV-1) is an important causative agent of "Shipping Fever", an upper respiratory tract disorder that costs the US cattle industry more than $500 million/year. Acute infection by BHV-1 results in conjunctivitis, pneumonia, genital disorders, abortions, and occasionally encephalitis. As discussed above, BHV-1 establishes latency in sensory neurons located in trigeminal ganglia, and also germinal centers within the tonsil. Periodically BHV-1 reactivates from latency, which is crucial for virus transmission in the field. In sharp contrast to latency in which viral gene expression is severely restricted, 75-80 viral genes are expressed during productive infection and reactivation from latency. The bICP0 protein activates expression of all viral genes, and thus stimulates acute infection and reactivation from latency. Our recent studies identified four separate domains in bICP0 that are necessary for activating transcription: 1) the zinc RING finger located between amino acids 13-51, 2) a large domain spanning amino acids 78-265, 3) sequences at or near amino acid 457, and 4) a nuclear localization signal located at the C-terminus. bICP0 also interacts with chromatin remodeling enzymes; histone deacetylase 1 (HDAC1) (116) and p300, a histone acetyltransferase (HAT). Functional studies demonstrated that bICP0 inhibits interferon (IFN)-induced transcription, and cooperates with p300 to activate viral transcription. Finally, a bICP0 null mutant was constructed that does not efficiently replicate or kill bovine cells, but this mutant strongly induces the IFN response. Our long-term goals are to delineate the mechanisms by which bICP0 stimulates viral gene expression, productive infection, and reactivation from latency.

Clayton L. Kelling, BS, MS, PhD, DVM
Professor

Microbiologist/Virologist

Appointment: .85 FTE Research; .15 FTE Teaching

Our research is focused on pathogenesis of bovine respiratory syncytial virus (BRSV) and bovine viral diarrhea virus (BVDV) infections in cattle. Immunity to BRSV infection is incomplete and reinfections occur. Protective host immune responses to vaccines or natural infections may be compromised by mutation of the surface glycoproteins. We are examining the roles of the BRSV surface attachment (G) and fusion (F) glycoproteins in pathogenesis and immunity. Genetic and antigenic heterogeneity, and structure of the BRSV G and F glycoprotein are being studied to determine the influence of those variables on survival of the virus in the host and on development of protective immunity in the host. Our studies involve use of recombinant BRSV glycoproteins expressed in insect cells using the baculovirus vector and developing of a cDNA BRSV F protein vaccine.

The overall goal of our BVDV research is to study the mechanisms involved in the pathogenesis of acute genotype 2 BVDV infections by studying virulence. We are examining the 5' untranslated region (5'UTR) of BVDV isolates for conserved nucleotide base substitutions in the internal ribosomal entry site (IRES) which are biologically significant. Translation studies using cDNA plasmid constructs of the 5' UTR of isolates from a panel of genotype 2 BVDV isolates are being used to study relationships between translational efficiency and virulence of individual isolates in experimental calf infection studies.

Since naturally-occurring pneumonia in cattle or neonatal calf diarrhea typically involves infection of the host with more than one infectious agent, we are also studying the interaction of BVDV with BRSV or bovine rotavirus in concurrent *in vivo* and *in vitro* infections.

Teaching responsibilities include serving as major advisor for graduate students, mentoring undergraduate students conducting thesis research projects, and as course instructor. I am the sole instructor for two courses, Principles and Prevention of Livestock Diseases and our departmental undergraduate capstone course: Integrated Principles and Prevention of Livestock Diseases. Each year, I have also contributed guest lectures in immunovirology or vaccinology courses.

Marjorie F. Lou, BS, MS, PhD
Professor

Biochemistry/Biomedical Sciences

Appointment: .90 FTE Rsch; .10 FTE Tchg

Main Focus: Biochemical Mechanism of Senile Cataract Formation

Our focus on the biochemical mechanism of age-related cataract formation is oxidative stress. We used hydrogen peroxide-induced cataract in organ culture condition as our model to study the progressive changes in morphology and intracellular redox potential in the lens. We demonstrated that lens opacification is associated with the increased protein insolubility and protein aggregation, resulting from lens protein oxidation by oxidative stress. We also showed that the thiol groups in lens proteins are oxidized by forming protein-thiol mixed disulfides first followed by protein protein disulfide formation, a condition that will lead to lens opacification. We studied the site of thiolation on lens proteins by using mass spectrometry and found a direct evidence that protein thiolation caused change in protein conformation, thus supporting our hypothesis that protein-thiol mixed disulfide formation plays an important role in cataractogenesis.

We discovered that the lens has an intrinsic repair enzyme systems, the thioltransferase/GSH and thioredoxin/thioredoxin reductase/NADPH systems, which can repair the damaged lens proteins/enzymes and restore their biological functions. We cloned, sequenced and characterized these enzymes and found them to be extremely oxidant-resistant in the lens epithelium cells. The physiological function of the two repair systems is proposed to be oxidative stress defense enzymes by preventing the accumulation of oxidant induced protein-protein disulfide in the lens and to regulate the thiol/disulfide homeostasis so that the lens will not be permanently damaged by oxidative stress.

Redox Signaling in the Lens Epithelial Cells

We examine the physiological function of reactive oxygen species in promoting cell growth and differentiation in the lens. This is a new research direction, which requires a lot of knowledge in signal transduction and the redox biology combined. We are using a growth factor, PDGF, as a model to study the mechanism of the mitogenic action of PDGF in cell proliferation. We now have extensive data suggesting that a growth factor binding can trigger generation of reactive oxygen species (ROS) via the membrane enzyme NADPH oxidase. ROS is then used by the cells to inhibit phosphatases, so that phosphorylation (activation) of signaling components, such as the MAPK cascades, can be initiated. We are also working on the regulation of this redox signaling system and investigating several transcription factors in the nucleus that are associated with gene expression under such experimental conditions.

Cataract Models

Our effort is also to establish a cataract model relevant to humans. We have recently developed a thioltransferase kockout mouse model, which showed lens protein aggregation as the animal aged beyond 13 months old, while the age-matched wild type remained normal. Thus, this is a model very much mimicking human age-related cataract. We plan to use this model to study the benefit of using various antioxidants and examine their efficacy against protein aggregation, including using thioltransferase, which is lacking in the lens of these animals.

D. Scott McVey, PhD, DVM
Associate Professor

Bacteriologist

Appointment: .25 FTE Rsch; .25 FTE Tchng; .50 Srvc

My long-term goal is to contribute to the understanding of virulence mechanisms of bacterial pathogens of food producing animals, with particular emphasis on elucidating the mechanisms by which bacteria infect and persist in tissues. The objectives in my research projects are to determine cellular, molecular and genetic mechanisms by which *Mannheimia haemolytica and Mycobacterium avium* subspecies *paratuberculosis* overcome the bovine immune system and persist in bovine tissues. The central hypothesis is that these bacteria respond to environmental conditions associated with local inflammation by induction and subsequent selection of phenotypes that express increased resistance to a broad array of host-generated immune effector mechanisms. We are approaching these studies initially by investigating the relationships between metabolic processes of the organisms and expression of known virulence factors. Our rationale for this research is that completion of this overall objective would be expected to lead to improved preventative and therapeutic approaches and diagnostic procedures for Johne's Disease and the bovine respiratory disease complex.

In addition, we are involved in developmental research to improve diagnostic medicine, especially for infectious diseases of food producing animals. This includes the continued development of The Nebraska Veterinary Diagnostic Center's (NVDC) capabilities to function as an integrated diagnostic laboratory resource of the National Animal Health Laboratory Network (NAHLN). As an integrated laboratory, the NVDC must strive to improve the efficiency of accurate laboratory testing, with emphasis on foreign animal diseases (FADs) as well as emerging and re-emerging threats. There are many ongoing projects that support these objectives such as evaluation, verification and validation of assays to diagnose FADs, bluetongue disease, tritrichomoniasis, brucellosis and tularemia. The laboratory is also involved in the development of novel methodology to detect trends in antimicrobial resistance and metabolic biochemical variation among bacteria of veterinary significance. In addition, the laboratory is involved with evaluation of the efficiencies of diagnostic test methods with regard to reliability, training, data reporting and material costs.

Rodney A. Moxley, DVM, PhD
Professor

Microbiologist

Appointment: .10 FTE Tchng; .90 FTE Rsch

My research involves two main areas, the pathogenesis of enterotoxigenic *Escherichia coli* (ETEC) in swine and pre-harvest food safety on *E. coli* O157:H7. My research on ETEC in swine is focused on study of the roles of enterotoxins in enhancement of bacterial colonization of the intestine and causation of diarrheal disease. We are also currently studying the role of the immune response to K87 capsular polysaccharide in complement-mediated serum killing of ETEC serotype O8:K87. My research on *E. coli* O157:H7 mainly involves study of the roles of secreted bacterial proteins and immune responses to these proteins in enhancement or reduction of intestinal colonization, respectively. In addition, my research on *E. coli* O157:H7 involves collaborative field studies addressing the epidemiology and testing of pre-harvest intervention strategies for this organism in feedlot cattle.

My teaching responsibilities involve the instruction of BIOS/VBMS 441/841 Pathogenic Microbiology, serving as major advisor for graduate students, and serving as a member of graduate supervisory committees. I have also served several terms as the departmental representative on the College of Agricultural Sciences and Natural Resources (CASNR) Curriculum Committee.

Fernando A. Osorio, MV, MS, PHD, ACVM

Professor

Virologist

Appointment: .60 FTE Rsch; .40 FTE Diag Srv

My research centers on pathogenesis of viral infections. In the last decade we have focused on a major viral agent that affects swine: Porcine Reproductive and Respiratory Syndrome Virus (PRRSV, an arterivirus, ssRNA+ genome). PRRSV currently causes the most economically significant infectious disease of US swine stock. Our initial interest in this disease centered on the primary characterization of the cell tropism of this virus *in vivo*. We initially detected and characterized a novel tropism of PRRSV for male germ cells. Such a specialized tropism of PRRSV results in death of these cells by (*in vivo*) induction of apoptosis. This selectivity for testicular germ cells also explains the transmission of PRRSV via semen, one of the most imporatnt routes of dissemination of this agent. We have also further characterized the immunobiology of persistence of this virus in convalescent animals. Our research seems to indicate that, contrary to other known examples of RNA virus persistence, the persistent infection established by PRRSV is finite and seems to involve a low level of productive infection that progressively declines until complete viral clearance takes place. We found that during the period of viral persistence, extensive modulation of the homologous (PRRSV-specific) cell-mediated and humoral immune response takes place. We are particularly interested in the mechanisms responsible for establishment of protective immunity against PRRSV. There is an urgent need for improvement of the vaccines that are currently used against PRRSV. We have discovered that a major role for protection against infection and disease caused by PRRSV resides with a type of PRRSV-specific antibodies that has the ability to render PRRSV un-infectious (i.e. antibodies that neutralize PRRSV). The key to a better protection against PRRSV resides on the development of better and safer vaccines that would prevent infection and possess more genetic stability than the commercial attenuated vaccines currently in use. To that end, we are interested in: 1) characterization of the major immunogenic components of PRRSV, and 2) characterization of the genes responsible for the ability to produce disease (virulence) by PRRSV. Knowing the genetic basis of PRRSV virulence and attenuation should permit a more precise design of safer, more efficacious vaccines.

Diagnostic Service: As the director of diagnostic virology at the Veterinary Diagnostic Center, my main goal has been to expedite the diagnostic process through the implementation of rapid tests that are based on the direct detection of viral components or anti-viral antibodies in the clinical sample. I am particularly interested on the evaluation of the fitness and robustness of new commercial diagnostic serologic kits for PRRSV and for Foot-and-Mouth Disease Virus (FMDV). In the latter case, the differential (i.e. capable of distinguishing infected from vaccinated animals) kits for FMDV may be of cardinal importance to US Agriculture, in case any form of vaccination is considered as a viable rapid response against a possible outbreak of this disease in the US. Another major responsibility as diagnostic virologist is my maintaining an active diagnostic surveillance for Pseudorabies Virus (PRV) , a very important herpesvirus that has been recently eradicated of domestic swine in the U.S. Our diagnostic virology lab serves as reference for other labs nationwide in relation to molecular detection of PRV in tissues of animals suspects of PRV infection.

Regarding teaching, I collaborate with team teaching of virology courses. Together with Dr. Charles Wood, I co-teach a course on Advanced Viral Pathogenesis and collaborate with a team teaching of Advanced Viral Immunology.

Asit K. Pattnaik, BS, MS, PhD
Professor

Virologist
Center for Virology and
Department of Veterinary and Biomedical Sciences

Appointment: .80 FTE Rsch; .20 FTE Tchg

My research focuses on various aspects of viral genome transcription, replication, and virus assembly in cells infected with viruses. As model systems for these studies, we use vesicular stomatitis virus (VSV), a non-segmented negative-strand RNA virus, hepatitis C virus (HCV), a positive-strand RNA virus, and porcine reproductive and respiratory syndrome virus (PRRSV), another positive-strand RNA virus. VSV is a cattle pathogen but has been widely used as a paradigm for understanding of biology of this group of RNA viruses that include some of the most serious human pathogens. HCV is a significant human pathogen for which no effective antiviral therapy is currently available. PRRSV causes economically significant diseases in swine population.

In recent past, our research has been centered on the understanding the mechanism of VSV genome transcription and replication. We have generated plasmids encoding subgenomic replicons of VSV that when transfected into mammalian cells, faithfully reproduce the processes of transcription and replication that is normally observed in virus-infected cells. Using the system of reverse genetics that I developed several years ago, we have examined many different aspects of the mechanisms of this virus genome transcription and replication. We have proposed a model suggesting that nucleotide sequences present at the beginning and the end of each gene coding sequences of VSV contain regulatory signals that mediate synthesis of five individual mRNAs from the large viral genome in infected cells. In addition, in a separate model, we have proposed that differential phosphorylation of one of the key viral proteins (the phosphoprotein, P) regulates the transcription and replication functions of the viral RNA polymerase. Logical ongoing studies are directed at generating and characterizing mutant viruses with defects in the P protein so that it may be possible to create viruses with attenuated phenotypes for development of viral vaccines.

In the area of HCV, we are attempting to develop a system for replication of subgenomic replicons in transfected mammalian cells. These are extremely challenging studies, but if successful, will advance the field significantly. For these studies, we have generated a variety of HCV subgenomic replicons and are currently examining their ability to replicate in transfected cells. In addition, our studies are directed at generating infectious HCV from mammalian cells. Currently, attempts to develop antiviral therapy against this virus are hampered by the lack of a system to grow and propagate the virus in cultured cells. With PRRSV, we have generated a full-length cDNA clone of the viral genome in a transcription vector. In vitro transcripts generated from the cDNA clone when transfected into MARC-145 cells resulted in production of infectious recombinant PRRSV from the cells. The recombinant PRRSV generated from the cDNA exhibited pathogenic properties similar to that of the parental virus. We are currently using this reverse genetic system to determine the virulence and attenuation determinants of PRRSV. Results from these studies will be significant in our attempt to develop safe and more efficacious vaccine to combat PRRS. Using infectious VSV cDNA clone, we are also generating recombinant VSVs containing PRRSV genes to examine cell-mediated and humoral immune response to the specific PRRSV proteins.

Douglas G. Rogers, BS, DVM, MS, PhD
Professor

Pathologist
Veterinary Diagnostic Center

Appointment: 1.0 FTE Diagnostic Service

My major responsibility within the Department of Veterinary and Biomedical Sciences and within the Veterinary Diagnostic Center is diagnostic veterinary medicine. As a diagnostic pathologist, the position requires the histopathologic examination of diseased tissues, performing necropsies, assimilation and evaluation of supportive laboratory data, reporting to referring veterinarians or animal owners, preparing the laboratory reports and researching pertinent scientific literature. My special interest is conducting field investigations relative to infectious disease of livestock. This position has afforded me several opportunities to identify "new" infectious diseases of livestock and also to identify "new trends" of "old diseases." The ultimate goal of these investigations has been (and will be) to establish intra- and inter-institutional collaborative studies on the pathogenesis of infectious diseases of livestock. My teaching responsibilities include the training of graduate students/residents interested in diagnostic veterinary medicine, advising graduate students (as major advisor or committee member), conducting research on bacterial diseases of livestock.

Gary P. Rupp, DVM, MS, ACT Diplomate
Professor & Director

Theriogenology
Great Plains Veterinary Educational Center
Clay Center, Nebraska

Appointment: .50 FTE Tchg: .30 FTE Rsch; .20 FTE Srvc

As Director of The University of Nebraska Great Plains Veterinary Educational Center I work with other Departmental faculty to provide instruction in clinical and applied areas of production management and specialized health care for veterinary students in the professional curriculum of the joint KSU/UNL program. This mission is accomplished through another important activity, which is providing health and production management services for the US MARC livestock in concert with the Herd Health Veterinarian. The combination of duties provides an excellent opportunity for student experience in clinical veterinary medicine and livestock management.

An additional aspect of our Center is that of providing continuing education programs for graduate veterinarians. This activity requires working with a wide array of allied specialists in the diverse areas involved in the beef cattle industry. We are just finished providing the eighth Beef Cattle Production Management Series which increases our total participation to more than 140 veterinarians. They represent beef cattle practitioners from across the United States and Canada and also from other aspects of the animal health industry. During the past three years this educational series has evolved into an optional graduate program which usually leads to an MS degree through distance education but has contributed to several PhD programs as well. The Series is currently being taught by University from Animal Science, Agronomy, Agricultural Economics, Veterinary Science from the University of Nebraska and educators from Kansas State University, Iowa State University, the University of Missouri, Texas A&M University, as well as specialists from other beef industry perspectives.

Research by faculty involves projects conducted in cooperation with U. S. Meat Animal Scientists and with cooperating producer herds and private feed yards in Nebraska. Recent efforts have been associated with reproduction, antibiotic residues, and tracking calves through retained ownership from birth to processing. The development of biosecurity and quality assurance programs for beef producers, and work to prevent and control foodborne pathogens. Additional projects have been carried out in areas of neonatal health and production.

In the future the GPVEC program hopes to further expand the interaction of other colleges of veterinary medicine and related disciplines to broaden the teaching and industry exposure for graduate veterinarians and allied specialists to provide a broad and in-depth coverage of production, management, economic, and health related issues essential for providing service to progressive livestock producers.

Our faculty wish to continue improving our involvement in areas of clinically related research, extension, and veterinary service to MARC, Nebraska producers, and the entire livestock industry. This can best be accomplished through our cooperation and interactive participation in education, research, and service commitments. The benefits of distance education and other innovative multimedia technologies are gradually increasing general knowledge and will enhance our service to the livestock industry.

John A. Schmitz, DVM, PhD
Professor

Veterinary Pathologist
Veterinary Diagnostic Center

Appointment: .45 FTE Tchng; .55 FTE Diag

My duties include participating in the diagnostic pathology rotation in the Veterinary Diagnostic Center and teaching two courses, VBMS 101, Introduction to Animal Health Careers (1 cr hr) and VBMS 408 (4 cr hr), Functional Histology.

At this time, I am working on a research project entitled, "Recruitment and Retention of Food Animal and Rural Veterinarians in Nebraska." A survey of Nebraska veterinarians was conducted to obtain data about background characteristics of veterinarians in food animal practices. Similarly, data was obtained regarding factors that importantly influenced decisions of veterinarians to chose rural (or urban) communities in which to practice. Data was also obtained about the perceptions of practicing veterinarians regarding current and future shortages of rural veterinary practitioners. Some of this data was presented in a VBMS Seminar on November 21st. A presentation about this topic will also be given at the Annual NVMA Meeting on January 19, 2006. Because of the national interest on this topic, additional invitations to present the data at national and/or regional meetings are anticipated. Submission of a manuscript for publication in the Journal of Veterinary Medical Education is a goal for 2006.

Another project I am currently working on entitled, "Management Model for Diagnosis, Control and Monitoring BVDV-Free Status in Beef Cattle Herds." I am a co-principal investigator with Dr. Gary Rupp, Director, Great Plains Veterinary Educational Center, working on an Agricultural Research Division Research Project proposal that we are preparing for submission in the near future. There are other VBMS faculty members and other collaborators from outside UNL who are also contributing to this project. While on faculty development leave, I proceeded on composing the initial draft of the project description.

My appointment as Diagnostic Pathologist includes being responsible for necropsy, histopathology, ordering the appropriate tests, evaluating/ interpretation of test results, report preparation and consultation for cases received by the VDC on the days when I am on pathology duty. Additionally, I have responsibility for the interpretation of test results on bacteriology cases in the absence of a diagnostic bacteriologist. Because of being gone for six months on faculty development leave, I assumed pathology duties only from July/December 2005 and was the case coordinator/pathologist for 444 cases during that time.

David R. Smith, BS, DVM, PhD
Dipl. ACVPM (Epidemiology)
Associate Professor

Extension Dairy and Beef Veterinarian

Appointment: .75 FTE Ext; .25 FTE Rsch

The goals of my research and extension programing are to contribute new knowledge and apply existing knowledge to solve animal and public health problems associated with dairy and beef production systems. I conduct research on, and communicate applications of, biosecurity and pathogen containment to control pathogens that affect dairy and beef cattle health and pre-harvest food safety.

My current research and extension efforts are directed towards animal production food safety related to *Escherichia coli* O157:H7 and *Salmonella* in feedlot cattle, evaluating herd-level diagnostic approaches for Johne's disease and bovine viral diarrhea in dairy and beef cattle, and evaluating new production systems to prevent calf scours on Nebraska Sandhills ranches.

Greg A. Somerville, BS, MS, PhD
Assistant Professor

Infectious Disease Specialist/Microbiologist
Center for Redox Biology and
Department of Veterinary and Biomedical Sciences

Appointment: .90 FTE Rsch; .10 FTE Tchng

S. aureus and *S. epidermidis* are the two leading causes of nosocomial infections in the USA, resulting in dramatically increased morbidity and treatment costs. Additionally, *S. aureus* is a major cause of bovine mastitis, a disease costing the USA approximately $2 billion annually, due to reduced production, animal replacement costs, discarded milk, treatment costs, and veterinary fees. My research focuses on addressing how environmental conditions affect the bacterial metabolic status and, in turn, how the metabolic status affects staphylococcal virulence. This is particularly important in the era of "omics," when genomics, proteomics, and high throughput mutagenesis screens consistently identify the genes of bacterial physiology and metabolism as being important, or essential, for pathogenesis. Currently, my lab is working on identifying the intermediary metabolism derived signals in *S. aureus* that facilitate the transition from a commensal state to a pathogenic state. The long-term goal of my research is the elucidation of mechanisms by which *Staphylococcus aureus* and *S. epidermidis* controls virulence factor production in response to metabolic and environmental stimuli. It is anticipated that by understanding the mechanisms of virulence regulation in response to environmental stimuli that vaccines can be developed that will attenuate the bacterial response to the host environment.

David J. Steffen, BS, DVM, PhD, ABVP
Professor & Director

Diagnostic Pathologist
Veterinary Diagnostic Center

Appointment: 1.0 FTE Diagnostic Service

My appointment in the Nebraska Veterinary Diagnostic Center is to serve as the Director and as a Diagnostic Pathologist. My scholarly component involves making use of case materials. A regular funded congenital defects referral center was established and I was actively investigating Dwarfism in Angus cattle. I am working with the Angus and Hereford Associations to update their genetic disease control policies. Collaboration with Dr. Kelling on BVDV infections in calves is ongoing as is collaborative studies in West Nile virus infection in horses. Laboratory accessions continue to rise.

Major time commitment is toward providing administrative guidance to the Diagnostic Center and providing diagnostic and consultation services to the Nebraska livestock industry. I served as a case coordinator on 1,300-1,400 investigations per year, which involve a multi-disciplinary approach to disease diagnosis. All cases culminate in a written report to the veterinarian and/or the animal owner, and often telephone consultations regarding disease management.

Arden R. Wohlers, BS, DVM
Extension Assistant Professor

Beef Cattle Health and Production Management
Department of Veterinary and Biomedical Sciences and
Panhandle Research & Extension Center, Scottsbluff, NE

Appointment: .50 FTE Extension Services

My 0.50 FTE position includes veterinary education responsibilities at the UNL Panhandle Research and Extension Center. The principal goal for my position is to contribute to the viability and growth of the animal agriculture industries in western Nebraska, especially the beef cattle industry and public health. I am responsible for coordination and cooperation with faculty and staff located at PHREC and other research and extension centers, VBMS, GPVEC and other UNL units.

I am responsible for development, coordination and implementation of educational programs that are sensitive to the needs of animal owners, veterinary practitioners, extension personnel and wildlife managers. My programs relate to animal health and production management that is pertinent to industry.

I deal with one on one conferences concerning isolated disease or management problems on a daily basis. An emphasis is placed on biosecurity applications for animal production systems. Currently my focus programs are the IRM pen of 5 demonstration project, foreign animal disease and agroterrorism issues and the planning for a beef industry discussion group to be implemented in the future. I am involved in the study of veterinary needs of the future in rural Nebraska.

Y. "Joe" Zhou, BSc, PhD
Research Associate Professor

Cell Biologist
Manager, Microscopy Core Research Facility
Center for Biotechnology and
Department of Veterinary and Biomedical Sciences

Appointment: .70 FTE Managing & Srv; .20 FTE Rsch; .10 Training & Tchg

As Manager for the Microscopy Research Core Facility, Center for Biotechnology, my main goal has been to establish and maintain the-state-of-art microscopy imaging facility, which provides expertise and instrumentation to researchers within/outside UNL. I am also actively involved in research collaborations and in providing technical support for seeking research funding. One of the major research and service projects involves the use of immunochemical labeling and digital imaging technology to support an NIH-funded collaborative study of viral pathogenesis by a group of scientists from UNL, UNMC and UNC. Microscopy imaging technologies we provide include: a) immunofluorescence microscopy using whole tissues or sections, b) multi-probe *in situ* hybridization, c) real-time imaging confocal microscopy (i.e. detection of GFP-tagged proteins in live cells in cultures and d) transmission and scanning electron microscopy. My research is focused on genetic and environmental effects on stress responsiveness in relation to age-related neurodegeneration using animal models. The goal of my research is to establish a mouse model of altered stress response in order to identify and characterize the genes/proteins associated with or affecting stress susceptibility and aging. One of the ongoing projects, in collaboration with Dr. MK Nielsen of Animal Sciences, is genetic selection of mouse lines with high and low responsiveness to stress, in order to establish a useful mouse model of stress-induced early aging and neurodegeneration. Molecular events associated with stress-induced abnormalities remain ambiguous despite scientific advancement, owing to the complexity of genetic and environmental interactions. Many experimental paradigms have been used to study the mechanisms of stress responses in animals, but to date there is no well-documented animal model generated from genetic selection for altered corticosterone response to stress to facilitate the study of stress-induced changes in gene expression with relation to behavioral abnormalities. We recently initiated genetic selection of two mouse lines for high and low stress responsiveness (SH and SL lines, respectively), using serum corticosterone as one of the key criteria. After completion of the selection process for the second generation, the SH mice displayed up to twice the level of serum corticosterone observed in the SL mice (with or without exposure to stress). The initial microarray using the SH/SL mouse brains revealed significant differences in expression of many genes between the stressed and control mice within the same line and between the two genotypes. I, therefore, *hypothesize* that the difference in stress responses between the SH and SL lines results from complex genetic alteration (mainly in differential gene expression), and in mechanisms of central response to stress that were applied throughout the genetic selection process. Major focuses of my research are 1) *In vitro* characterization of biochemical properties and functional integrity of primary cultured hippocampal neurons derived from the embryonic SH and SL mice; 2) Assessment of behavioral activity and cognitive performance and subsequent gene expression profiling in the SH and SL mice in response to stress; and 3) Gene expression profiling and behavioral/cognitive assessments in the SH and SL mice in response to chronic stress in relation to the aging process in order to identify age-related genes associated with high or low susceptibility to chronic stress. This research is expected to foster an increased understanding of the molecular and biochemical events associated with neuronal calcium/kinase signaling and with regulation of genetic and environmental interactions in the mechanisms of stress.

Department of Veterinary and Biomedical Sciences Researchers, Postdoctoral and Senior Research Associates 2006

Name **Ofelia Chaćon-Barletta** **Title: Postdoctoral Research Associate**
Mentor Raúl G. Barletta, UNL; G. Adams (TX A&M Univ)
Degree(s) **MSc** – January 1995 – University of Antioquia, Colombia (Immunology)
MD – July 1991 – University of Antioquia, Colombia (Physician and Surgeon, General Practice)
PhD – December 2002 – Texas A&M University, Texas (Microbiology)

Name **Weiping Peng**[2] **Title: Senior Research Associate**
Mentor Clinton J. Jones
Degree(s) **BS** - July 25, 1982 - Anhui Agricultural University - China (Sericulture)
MS - December 26, 1986 - Anhui Agricultural University - China (Silkworm genetics and breeding)
PhD - March 4, 2000 - Chinese Academy of Agricultural Sciences, China (Silkworm genetics and breeding)

Name **Mustapha Moulay Samrakandi**[2] **Title: Researcher**
Mentor Jeffrey D. Cirillo
Degree(s) **BS** - June 1985 - Marrakech, Morocco - Sahnoun College (Experimental Sciences)
MS - September, 1990 - France - University of Sciences Toulouse III (Biochemistry)
Post-Graduate Diploma - September 1991 - France - Polytechnic National Institute - Toulouse III (Phytrsanitary and Antiparasitic Agrochemistry)
PhD - February 1996 - France - University of Sciences Toulouse III (Microbiology)

Name: **Marat R. Sadykov**[1] **Title: Postdoctoral Research Associate**
Mentor: Greg A. Somerville
Degree(s) **MSc** – June 1991 – Kazan State University, Kazan, Russia (Genetics)
PhD – April 1999 – Moscow State University

Name **Christina Topliff** **Title: Postdoctoral Research Associate**
Mentor Clayton L. Kelling
Degree(s) **BS** – May 1985 – Kansas State University, Manhattan, KS (Veterinary Science)
MS – December 1995 – University of Nebraska-Lincoln, Lincoln, NE (Veterinary Science)
DVM – May 1987 – Kansas State University, Manhattan, KS
PhD – December 2004 – University of Nebraska-Lincoln, Lincoln, NE (Integrative Biomedical Sciences)

Name **Kuiyi Xing** **Title: Senior Research Associate**
Mentor Marjorie F. Lou
Degree(s) **BS** - July 15, 1991 - Fudan University, Shangaahi, People's Republic of China (Biochemistry)
PhD - December 20, 2002 - University of Nebraska-Lincoln (Biochemistry)

Name **Sandra Elizabeth Perez-DeBretschneider**[1,2]

Mentor Clinton J. Jones **Title: Postdoctoral Research Associate**

Degree(s) **MS** – June 05, 2000, University of Mar Del Plata, Buenos Aires, Argentina (Animal Virology)

DVM – April 3, 1996, Universidad del Centro de la Provinicia, DeBuenos Aires (UNCPBA), Buenos Aires, Argentina (Animal Health)

PhD – May 2006, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (Molecular Virology)

Specialist in Animal Health Degree – December 1996, University of Mar Del Plata, Buenos Aires, Argentina (Animal Health)

University of Nebraska Lincoln

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES
Office of the Dean

December 20, 2006

TO: IANR Faculty Involved in CASNR Instruction/Advising

FROM: Steve Waller
Dean

SUBJECT: ***Academic Appointment Summary***

Enclosed is a summary of your calculated FTE for the 2005-2006 academic year (Fall 2005, Spring 2006, Summer 2006). This is a measure of effort, not quality of instruction or advising. The CIEQ, Peer Review and Student Outcomes Assessment provide opportunities to address quality. The documentation for the Academic Appointment is on the CASNR website at http://casnr.unl.edu/facstaff/forms.htm

We have provided a format for the academic appointment summary that identifies the contributions of each category (Advising, Adjustments and Instruction) to the total calculated FTE. If you are on an academic year appointment, the calculated FTE has been adjusted. The budgeted FTE is taken from the 2005-2006 Departmental Budget Listing and will not reflect changes made after April 1, 2005. Mid-year adjustments in your budgeted FTE are considered during the evaluation process. Please contact Associate Dean Dann Husmann if you have any questions about the enclosure. Your historical summary of the academic appointment is available upon request. Please contact Carol Wusk for a summary.

Although completing the *Academic Appointment Information Sheet* is time consuming and may appear more bureaucratic than necessary, it has proven to be very accurate College-wide. It allows you, your unit administrator and the College to make knowledgeable decisions regarding workload adjustment and resource allocation. As helpful as it is within the College, its benefit is even greater when campus administration is evaluating academic appointments across colleges.

CASNR is the only college with substantial quantitative documentation. Our process acknowledges important components of the academic appointment that cannot be measured by student credit hour production alone. Consequently, the data that you help us collect has greatly strengthened our position in discussing faculty load among the other colleges. For that I am grateful and appreciate your time and effort invested in helping us each year with this activity.

Encl: Academic Appointment Summary (2005-2006)

cc: IANR Deans' Council w/o encl.

103 Agricultural Hall / P.O. Box 830702 / Lincoln, NE 68583-0702 / (402) 472-2201 / FAX (402) 472-7911 / www.casnr.unl.edu

VETERINARY AND BIOMEDICAL SCIENCES TREND

10-Year Report	Calculated FTE[1]											
	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07		Comments
Name	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE	Calculated FTE[2]	Budgeted FTE[3]	
Barletta	15	13	12	13	11	9	5	6	16	21.9	10	
Duhamel	5	3	3	8	9	8	6	6	8	0	10	
Jones	13	18	18	16	29	14	24	22	37	25.7	10	
Kelling	21	29	32	35	39	40	43	34	33	38.5	35	.35 FTE 7/02
Moxley	15	28	16	25	15	18	28	25	30	30.1	10	
Schmitz	20	32	31	33	31	37	37	18	0	0	45	Left Univ.
Sub-Totals							**143**	**111**	**124**	**116.2**	**120**	
Contract/Other Teaching Faculty												
Berg										128.1	0	
Brodersen						1	11	12	3	3.6	0	
Carlson							21	17	18	31.1	0	Contract 7/03
Doster				1	0	1	4	9	6	9.5	0	
Griffin										6.3	0	
Hardin L										6.8	0	
Kammerman										24.1	0	
Lou										7.6	0	
McVey										4.7	0	
Ondrak										20.1	0	
Pattnaik						4	7	13	21	15.7	0	Start 8/02 (Virology)
Rogers				2	1	2	9	9	10	4.5	0	
Rupp										21.5	0	
Smith										1.1	0	
Somerville								7	18	16.5	0	Start 8/04 (Redox)
Zhou						1	2	3	3	2.7	0	
Sub-Totals							**54**	**70**	**79**	**303.9**	**0**	
TOTALS							**300**	**274**	**203**	**420.1**	**120**	

[1]The CASNR Academic Appointment - Philosophy and Guidelines (Sept. 2003)

[2] Based on Fall 2006, Spring 2007, Summer 2007

[3] Fiscal Year 2006-2007, Departmental Budget Listing

02/14/2008

Department of Veterinary and Biomedical Sciences Teaching Program - Courses, 2006

Course #	Course Title /Cross listing	Credit Hours/Semester
VBMS 101	Introduction to Animal Health Careers	1 cr, I
VBMS 303	Principles and Prevention of Livestock Diseases	3 cr, II
VBMS 403	Integrated Principles and Prevention of Livestock Diseases	4 cr,
VBMS 408	Functional Histology Lec 2, lab 2	4 cr, II
VBMS 410	General Pharmacology and Toxicology	3 cr, II - Lec 3
VBMS 416	Veterinary Entomology/Ectoparasitology (Animal Science; Entomology; Forestry, Fisheries and Wildlife 416/816)	2cr, II
VBMS 424	Basic Molecular Infectious Diseases	3 cr, II, even numbered yrs
VBMS 441	Pathogenic Microbiology (BIOS 441/841)	3 cr, II
VBMS 452	Introduction to Molecular Virology and Viral Pathogenesis	3 cr, I
VBMS 488	Exploration of Production Medicine	2 cr, III - Lec 2
VBMS 496	Independent Study in Veterinary Science	1-5 cr, I, II
VBMS 499H	Honors Thesis	3-6 cr, I, II, III
VBMS 805	Introduction to Mechanisms of Disease	3 cr, II
VBMS 808	Functional Histology	4cr, II Lec/Lab
VBMS 811	Introduction to Veterinary Epidemiology	2 cr, III - Lec/Disc/Lab
VBMS 816	Veterinary Entomology/Ectoparasitology	2 cr, II
VBMS 816L	Veterinary Entomology/Ectoparasitology	1 cr, I
VBMS 818	Computer-aided Sequence Analysis Primer	2 cr, I
VBMS 820	Molecular Genetics (420/820) (BIOS 820)	3 cr
VBMS 824	Basic Molecular Infectious Diseases	3cr, I
VBMS 835	Animal Biochemistry (BIOS 835)	3 cr, II even numbered yrs
VBMS 838	Molecular Biology Laboratory (BIOS 838)	5 cr, III
VBMS 840	Microbial Physiology (BIOS 840)	3 cr
VBMS 841	Pathogenic Microbiology (BIOS 841)	3 cr, II Lec/Lab

Course#	Course Title Cross Listings	Credit Hours/Semester
VBMS 842	Endocrinology (ASCI 842, BIOS 842)	3 cr, I
VBMS 843	Immunology (BIOS 843)	3 cr
VBMS 845	Animal Physiology I (ASCI 845, BIOS 813)	4 cr, I Lec/Lab
VBMS 846	Animal Physiology II (ASCI 846, BIOC 814)	4 cr, II Lec/Lab
VBMS 847A&B	Interdisciplinary Concepts in Beef Production	3 cr, max 6, I, II
VBMS 848	Introduction to Veterinary Biotechnology	1-2 cr, II
VBMS 852	Molecular Virology and Viral Pathogenesis	3 cr, I
VBMS 899	Masters Thesis	6-10 cr , I, II, III
VBMS 901	Diagnostic Techniques	1-10 cr, I, II
VBMS 909	Seminar	1-4 cr, I, II
VBMS 919	Regulation of Eukaryotic Gene Expression	3 cr, II
VBMS 920	Measurement of Animal Disease and Production	2 cr, I
VBMS 921	Analytic Observational Studies in Veterinary Epidemiology	2 cr, I
VBMS 925	Critical Reading of the Epidemiology Literature	1-4 cr, II
VBMS 930	Advanced Food Animal Production Medicine	2 cr, II (even yrs)
VBMS 942	Microbial Genetics	3 cr
VBMS 944	Immunovirology (BIOS 944)	3 cr
VBMS 948	Concepts in Experimental Immunology (BIOS 948)	3 cr, II
VBMS 949	Vaccinology	3 cr, II, alternate yrs
VBMS 950	Medical Molecular Virology (BIOS 950)	3 cr, I
VBMS 951	Advanced Molecular Infectious Disease	3 cr, II
VBMS 964	Signal Transduction (BIOS 964)	3 cr
VBMS 966	Advanced Viral Pathogenesis (BIOS 966)	3 cr (alternate yrs)
VBMS 975	Seminar in Veterinary Histopathology	1 cr, I, II
VBMS 996	Research on Selected Problems in Veterinary Science	2-10 cr, I, II
VBMS 998	Special Topics in Veterinary Science	1-10 cr, I, II
IBMS 999	Doctoral Dissertation	1-10 cr, I, II, III

Department of Veterinary and Biomedical Sciences
2006 Enrollment

Spring, Semester, 2006

Course #	Course Title	Instructor	Students	Cr Hrs
VBMS 303	Preventive Livestock Diseases	Kelling	17	51
VBMS 403	Capstone:Issues Ani Health	Kelling	15	60
VBMS 441	Pathogenic Microbiology	Moxley	17	51
BIOSCI 441	Pathogenic Microbiology	Moxley	5	15
VBMS 496	Independent Study	Kelling	1	2
BIOS 841	Pathogenic Microbiology	Moxley	5	13
VBMS 899	Masters Thesis	Staff	3	6
VBMS 909	Seminar	Moxley	19	19
VBMS 964	Signal Transduction	Jones	7	21
VBMS 996	Research Problems	Staff	13	61
IBMS 999	Doctoral Dissertation	Staff	5	14

Eight Week Session, Summer

Course #	Course Title	Instructor	Students	Cr Hrs
VBMS 996	Research Problems	Duhamel	1	2

First Five-Week Summer Session, 2006

Course #	Course Title	Instructor	Students	Cr Hrs
VBMS 899	Masters Thesis	Staff	4	10
VBMS 996	Research Problems	Staff	10	29
IBMS 999	Doctoral Dissertation	Staff	3	7

Second Five-Week Summer Session, 2006

Course #	Course Title	Instructor	Students	Cr Hrs
VBMS 899	Masters Thesis	Staff	5	25
VBMS 996	Research Problems	Staff	9	27
IBMS 999	Doctoral Dissertation	Staff	3	7

Fall Semester, 2006

Course #	Course Title	Instructor	Students	Cr Hrs
VBMS 101	Animal Health Careers	Hardin	26	26
VBMS 408	Functional Histology	Dappen	23	92
VBMS 410	Pharmacology/Toxicology	Carlson	23	92
VBMS 496	Independent Study	Steffen/Brodersen	2	4
VBMS 499H	Honors Thesis	Duhamel	1	3
VBMS 808	Functional Histology	Dappen	1	4
VBMS 852	Molecular Viro&Viral	Jones/Pattnaik	26	78
VBMS 899	Masters Thesis	Kelling/Moxley	2	8
VBMS 901	Diagnostic Techniques	Duhamel	2	6
VBMS 909	Seminar	Hardin	22	22
VBMS 996	Research Problems	Staff	16	67
IBMS 999	Doctoral Dissertation	Staff	5	26

Department of Veterinary and Biomedical Sciences
Undergraduate Enrollment, 2006

2006 Spring Semester Enrollment

Veterinary Sciences	83
Pre-Veterinary Medicine	11
Veerinary Technician	2

2006 Fall Semester Enrollment

Veterinary Science	75
Pre-Veterinary Medicine	20
Veterinary Technician	3

Pre-Veterinary Ambassadors

Spring, 2006	**Fall, 2006**
Pam Fry	Malori Marotz
Alyse Aerts	Lauren Taylor
Lorie Painter	Kylie Wiedel

Undergraduate Degrees Obtained

May, 2006

Name	**Major**
Laura E. Painter	VBMS
Mikayla S Ward	VBMS
Alyse C. Aerts	VBMS
Michaela R. Clark	VBMS
Brett A. Scheiding	VBMS
Pamela R Fry	VBMS
Nichelle N. Ferdinand	VBMS
Jordan J. Bader	VBMS
Cody J. Hankins	VBMS
Emily M. Becker	VBMS

August, 2006

Nicole C. Hanson	VBMS
Ryan D. Muldoon	VBMS
Sonja Jo Witzki	VBMS

December, 2006

Amy R. Auch	VBMS
Jeffrey A. Korus	VBMS
Amanda J Young	VBMS
Jenny R. Prior	VETT

Department of Veterinary and Biomedical Sciences

Nebraska Residents Enrolled in KSU, CVM Academic Year 2006 (05-2005/04-2006)

Fourth Year Students	Class
Asche, Leslie	2006
Bangert, Alicia	2006
Carpenter (Spurgin) Rebecca	2006
Choma, Kimathi	2006
Crumly, Lindsey	2006
DiMari, Joseph	2006
Ditmars, Nora	2006
Hartmann, Erica	2006
Jones, Stephanie	2006
Kaliff, Melody	2006
Karlin, Wm. Mike	2006
Longfellow, Daniel	2006
Rath, Fatima	2006
Rowan, Jennifer	2006
Skavdahl, Elizabeth	2006
Smith, Eliza	2006
Stahl, Matthew	2006
Stuart, Jeremy	2006
Sund, Patricia	2006
Tolstedt, Calvin	2006
Tuller, Eric	2006
Jeremy Young	2006
Third Year Students	
Backlund, Michelle	2007
Becher, Megan	2007
Bessmer, Aaron	2007
Bockelman, Toni	2007
Buschkamp, Nicholas	2007
Cole, Jeremiah	2007
Creighton, Amanda	2007
Fellers, Kristen	2007
Friedericks, Marc W.	2007

Third Year Students (con't)	Class
Grosse, Miranda	2007
Heftie, David	2007
Jirovsky, Lynn	2007
Knisley, Cody	2007
Larson, Aaron	2007
Leach, Tiffany	2007
Nienhueser, Travis	2007
Olson, Emily	2007
Rainwater, Kimberly	2007
Schmid, Luke	2007
Stevens, Lindsey	2007
Stones, Allen	2007
Svehla, Nichole	2007
Thiel, Kevin	
Thomassen, Michael	2007
Tolstedt, Calvin	2007
Torpy, Rebecca	2007
Willers, Amanda	2007
Second Year Students	
Abel, Jeramie	2008
Bottger, Jeffrey	2008
Eitzmann, Allison	2008
England, Shauna	2008
Friedel, Christopher	2008
Haase, Melissa	2008
Holt, Kristina	2008
Kilburn, Jennifer	2008
Kilzer, Elizabeth	2008
Koppold, Emily	2008
Korus, Jeffrey	2008
Kruce, Rachel	2008
Lustgarten, Meghann	2008

Second Year Students (con't)	Class
Moravec, Martin	2008
Pigsley, Becky	2008
Robbins, Joel	2008
Schumacher, Stephen	2008
Staab, Dusty	2008
Stevens, Elliot	2008
Straka, Lindsey	2008
Talbott, Joan	2008
Waechter-Mead, Lindsay	2008
Wood, Jamie	2008
Wright, Leann	2008
First Year Students	
Fear, Clarence	2009
Flock, Katie	2009
Crystal Frost Rhine	2009
Corinna Gibbons	2009
Nathan Kotschwar	2009
Alicia Lloyd	2009
Shauna Malchow	2009
Brooke Martin	2009
Mathew McGraw	2009
Todd Mitchell	2009
Brian Stones	2009

Department of Veterinary and Biomedical Sciences Nebraska Residents that Graduated from Kansas State University (May, 2006)

Alicia Lynn Bangert

Leslie Ann Buggi

Joseph R. DiMari

Erica Lynn Hartmann

Stephanie Marie Jones

W. Michael Karlin

Jennifer C. Rowan

Eliza E. Smith

Jeremy James Stuart

Jeremy D. Young

Lindsey R. Blevins

Rebecca Jean Carpenter

Nora Francine Ditmars

Fatima Kimiyo Johnson

Melody Dale Kaliff

Daniel Jackson Longfellow

Elizabeth Skavdahl

Matthew D. Stahl

Eric G. Tuller

Department of Veterinary and Biomedical Sciences
University of Nebraska-Lincoln
Students Attending Other Veterinary Colleges
Other Than Kansas State or Iowa State

Name	Pre-Vet Curriculum Completed	Admitted to
Pamela Fry	UNL	Ohio State

Nebraska Residents Attending Iowa State University

Name	Class	Name	Class
Assad, Katherine M	2009	Aerts, Alyse	2010
Bierman, Merle J	2009	Arens, Brenda	2010
Deroin, Jamie L.	2009	Bader, Jordan	2010
Dinslage Tyson G.	2009	Bader, Donna	2010
Friedrich, Rachel A.	2009	Baker, Katherine	2010
Gulbrandson, Cody M.	2009	Behlke, Eric	2010
Jensen, Justin V.	2009	Eggers, Lesha	2010
Kahle, Kelsey L.	2009	Hadenfeldt, Tracy	2010
Kopf, Kelli M.	2009	Hankins, Cody	2010
Kreifels, Tammy L.	2009	Hanson, Nicole	2010
Meyer, Ashley E.	2009	Hayek, Sandi	2010
Perez, Margarita M	2009	Jenkins, Carrie	2010
Petersen, George F.	2009	Lurz, Jeri	2010
Pieper, Jason B.	2009	Martin, Amy	2010
Reiman, Amber N.	2009	Painter, Laura	2010
Reiter, Dawn M	2009	Pumphrey, Danielle	2010
Schaefer, Jennifer L	2009	Ringenberg, Glenn	2010
Schmidt, Megan E.	2009	Saathoff, Andrew	2010
Shemek, Angela K.	2009	Schmidt, Nathan	2010
Shultz, Mikaleh A.	2009	Uden, Jessika	2010
Smith, Rik R.	2009	Waddell, Jess	2010
Thiele, Melissa A.	2009	Worth, Troy	2010
Waples, Alison J	2009		
Whitted, Alexis L.	2009		
Woolard, Rebecca L.	2009		

Department of Veterinary and Biomedical Sciences
PHD & MS Graduate Students

MS Candidate/Advisor	*Program*	*Title Research Project*
Gulzar Ahmad BS, MS, Agric-Faisalabad India (GE Duhamel)	VetSci	Genetic diversity of *Brachyspira pilosicoli* isolated from humans and animals with Colonic spirochetosis
Karen Hansen BS, UNL (RA Moxley)	VetSci	Efficacy of an experimental *Escherichia coli* O157:H7 vaccine in cattle
Ching Hsin Hsu BS, China (FA Osorio)	VetSci	Protective immunity to PRRSV
Rasika Jinadasa BVSc, Peradeniya,India (GE Duhamel)	VetSci	Mouse susceptibility to *Helicobacter hepaticus* cytolethal distending toxin
Yuko Mori BS, UNL (CL Kelling)	VetSci	TBA
Marilia Oliveira DVM, Brazil (FA Osorio)	VetSci	Evaluation of immunogenic subunits of PRRSV using viral vectors
Holly Sampson BS, UNL (CL Kelling)	VetSci	TBA

PhD Candidate/Advisor	*Program*	*Research Project Title*
Lalit Beura BVSc, India (FA Osorio)	IBMS	Studies on virulence, pathogenesis and immune response of porcine reproductive and respiratory syndrome virus
Gustavo Bretschneider DVM, University of Nacional de Buenos Aires MS, National Univ of Mar Del Plata, Argentina (RA Moxley)	IBMS	Immune responses to *Escherichia coli* O157:H7 in cattle and role in protection
Kate Chen BA, MS, China (MF Lou)	BIOC	Investigating the initial sites of redox signaling in human lens epithelial cells
Phani Das BVSc, India (AK Pattnaik)	IBMS	Viral glycoproteins in PRRSV immunity
Harshdeep Dogra BVSc, PAU Ludhiana, India MVSc, CSKHPKV, Palampur, India (RG Barletta)	IBMS	Mechanisms of drug action and resistance in mycobacteria

Joseph Erume DVM, Makerere University, Uganda MS, University of London (RA Moxley)	IBMS	Influence of enterotoxins on virulence and colonization of the porcine intestine by *Escherichia coli*
Vicki Geiser BS, MS, Univ of NE-Lincoln (Clinton Jones)	BIOS	Regulation of productive infection by the bovine herpesvirus 1 encoded bICPO
Jamie Henningson BS, DVM, KSU (DJ Steffen)	IBMS	Comparative virulence of non cytopathic variants of NADL bovine viral diarrhea virus with mutation and non-structural protein NS4B or inpro by experimental inoculation of calves
Devon Kramer BS, Morningside Sioux City, IA (GA Somerville)	IBMS	Tricarboxylic acid cycle mediated regulation of *Staphylococcus aureus* virulence factors
Byung Kwon DVM, MS-Kon Kuk University Seoul, Korea (FA Osorio)	IBMS	Immunopathogenesis of porcine reproductive respiratory syndrome virus
Namal Liyanage BA, University of Sri Lanka MS, University of NE-Lincoln (GE Duhamel)	IBMS	Comparative structure and function relationship of cytoleathal disfending toxins from bacterial pathogens
Melissia Lucas (Greg Somverville)	BIOC	TBA
Florencia Meyer BS, MS, Uruguay, Texas Tech (CJ Jones)	BIOS	Functional analysis of the bovine herpesvirus 1 (BHV-1) latency related gene
Dhammika Navarathne BVSc, University of Peradeniya Sri Lanka (GE Duhamel)	IBMS	Pathogenesis of *Candida albicans* infection in a laboratory mouse model of disseminated candidiasis
Debasis Nayak BVSc, Orissa Vet College, India MVSc, Maras Vet College, India (AK Pattanik)	IBMS	Role of the nucleocapsid protein inVSV genome replication
Debasis Panda BVSc, MS, India (Asit Pattnaik)	IBMS	The phosphoprotein P of VSV and its functions in viral replication and assembly
Avery Paulson BS, MS, Univ of North Dakaota (DR Smith, RG Barletta)	IBMS	TBA
Sandra Perez DVM-Faculty of Vet Science, Argentina MS-Faculty of Agrarian Science, Argentina (CJ Jones)	IBMS	Bovine herpesvirus-1 induced pathogenesis
Susanne Rose (CJ Jones)	BIOS	TBA

PhD Candidate/Advisor	*Program*	*Research Project Title*
Susanne Rose (CJ Jones)	BIOS	TBA
Kazima Saira BS, MS, India (CJ Jones)	IBMS	Regulation of interferon production by α-herpesviruses
Sakthivel Subramaniam BVSc, MVSc, Inida (FA Osorio)	IBMS	Studies on virulence, pathogenesis and immune response of porcine reproductive and respiratory syndrome virus
Olga Vitvitskaia MS, Moscow Acad of Agriculture (CJ Jones)	IBMS	TBA
Yin Wang BS-MS-Taiwain (MF Lou)	BIOC	Signal transduction: The mechanism for ROS generation in lens epithelial cells
Yefei Zhu MEDI, MSVc Zhejiang Med Univ, India (GA Somerville)	IBMS	Exploiting staphylococcal metabolism to prevent biofilm associated heart infections

Department of Veterinary and Biomedical Sciences
2006 Graduate Degrees Obtained

MS Degree

December

Marillia Oliveira "Characterization and immunogenicity of recombinant Vesicular Stomatitis Virus expressing GP5 and M protein of Porcine Reproductive Respiratory Syndrome Virus"
Advisor: Fernando A. Osorio

PhD Degree

May

Sandra Perez "Analysis of bovine tonsils and trigeminal ganglia following infection with wild type bovine herpesvirus type 1 (BHV-1) or a latency-related mutant BHV-1 strain"
Advisor: Clinton J. Jones

Vicki Geiser, School of Biological Sciences
"Regulation of bovine herpesvirus 1 (BHV-1) productive infection by viral genes (bICP0 or the LR gene) and cellular transcription factors (p300 or C/EBPα)"
Advisor: Clinton J. Jones

Chao-Wei (Kate) Chen, Department of Biochemistry
"The physiological function of reactive oxygen species in human lens epithelia cells"
Advisor: Marjorie F. Lou

December

Byung Joon Kwon "Use of reverse genetics to study porcine reproductive and respiratory syndrome virus virulence"
Advisor: Fernando A. Osorio

Department of Veterinary and Biomedical Sciences Seminar Series, 2006

VBMS 909 Seminars
Spring Semester, 2006

January 9 — *"Emerging Zoonotic Disesaes"*
Alan R. Doster, Professor, Veterinary Pathologist, Department of Veterinary and Biomedical Sciences, Veterinary Diagnostic Center, Lincoln, Nebraska

January 23 — *"CCAAT enhancer binding protein alpha binds to Bovine Herpevirus-1 latency related fusion protein possibly modulating aspects of the latency/ reactivation cycle"*
Florencia Meyer, PhD Graduate Student, School of Biological Sciences, Department of Veterinary and Biomedical Sciences, Lincoln, Nebraska

January 29 — *"The molecular epidemiology of problem Staphylococcus aureus isolates: A real World application of Su Doku Science"*
Richard V. Goering, Professor and Interim Chair, Department of Medical Microbiology and Immunology, Creighton University, Medical Center, Omaha, Nebraska

February 6 — *"Results of microbiological examination of mule and white-tailed deer from Nebraska"*
Richard D. McKown, Candidate for an Adjunct Appointment in the department

February 13 — *"The Ying and Yang effect of oxidation in eye lens function"*
Marjorie F. Lou, Professor, Biomedical Biochemist, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

February 20 — *"Nuclear-cytoplasmic function of the porcine reproductive and respiratory syndrome virus capsid protein"*
Dongwan Yoo, Adjunct Professor, Department of Pathobiology, Ontario Veterinary College, University of Guelph, Guelph Ontario, Canada

February 27 — *"Farnesol as a virulence factor in a mouse model of systemic candidiasis"*
Dhammika Navarathne, PhD Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

March 6 — *"The molecular scaffold KSR2 regulates energy balance in vivo"*
Robert E. Lewis, Professor, Eppley Institute for Cancer Research and Allied Diseases, Cancer Genes and Molecular Regulation Program, University of Nebraska Medical Center, Omaha, Nebraska

March 27 — *"The inactivation of low molecular weight protein tyrosine phosphatase by oxidation is involved in steroid-induced cataract"*
Hideo Nishigori, Professor and Chair, Faculty of Pharmaceutical Sciences, Teikyo University, School of Pharmaceutical Science, Division of Medical and Pharmaceutical Sciences-II, Applied therapeutics, Kanagawa, Japan

April 3 — *"Analysis of miRNAs encoded by the Herpes Simplex Virus Type 1 latency-associated transcript"*
Weiping Peng, Senior Research Associate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 10 — *"Role of nucleocapsid protein in Vesicular stomatitis virus (VSV) replication"*
Debasis Nayak, PhD Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 17 — *"Influence of bovine respiratory syncytial virus F protein N-glycosylation on host cell fusion"*
Yuko Mori, MS Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 24 *"BHV-1 gene encoding infected cell protein (bICP0) inhibits antiviral signaling by inducing IRF3 degradation"*
Kazima Saira, PhD Graduate Student, Department of Veterinary and Biomeidcal Sciences, University of Nebraska-Lincoln

Fall Semester, 2006

August 21 *"D-alanine ligase as a candidate drug target to develop novel anti-mycobacterial agents"*
Harshdeep Dogra, PhD Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

August 28 *"From barnyard to dinner table: The omnipresence of hepatitis E virus in animals and risk for zoonosis"*
Xiang-Jin Meng, Associate Professor, Molecular Virology, College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, Virginia

September 11 *"Reduced intestinal colonization of adult beef cattle by Escherichia coli O157:H7 tir deletion and nalidixic-acid-resistant mutants lacking flagellar expression"*
Gustavo Bretschneider, PhD Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

September 18 *"The biological role of bacterial programmed cell death"*
Dr. Kenneth W. Bayles, Associate Professor & Vice Chair for Research, Department of Pathology and Microbiology, University of Nebraska Medical Center, Omaha, Nebraska

September 25 *"Replication and encapsidation of human papillomaviruses"*
Dr. Peter Angeletti, Assistant Professor, Nebraska Center for Virology, School of Biological Sciences, University of Nebraska-Lincoln

October 2 *"Mannheimia haemolytica: Efflux pump activity is associated with antimicrobial resistance and virulence"*
D. Scott McVey, Associate Professor, Department of Veterinary and Biomedical Sciences, Veterinary Diagnostic Center, University of Nebraska-Lincoln

October 23 *"Controlling Escherichia coli O157:H7 in fed cattle: a population approach"*
David R. Smith, Associate Professor, Extension, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

October 30 *"Virion host shutoff protein of Herpes Simplex Virus Type 1"*
Anisa K. Angeletti, Research Assistant Professor, Nebraska Center for Virology, School of Biological Sciences, University of Nebraska-Lincoln

November 6 *"Serologic marker candidates identified amongst B-cell linear epitopes of Nsp2 and structural proteins of a North American strain of porcine reproductive and respiratory syndrome virus (PRRSV)"*
Marcelo de Lima, Visiting Scholar, The Federal University, Santa Maria, Brazil

November 13 *"Staphylococcus aureus metabolism in a biofilm"*
Yefei Zhu, PhD Graduate Student, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

November 20 *"Variation in the genome of Escherichia coli O157:H7"*
James Bono, Microbiologist, Meat Safety and Quality Research Center, Clay Center, Nebraska

November 27 *"Phosphorylation regulates the activities of herpes simplex virus type 1 (HSV-1) immediate early protein ICP0"*
David J. Davido, Assistant Professor, Department of Molecular Biosciences, University of Kansas, Lawrence, Kansas

Departmental Special Seminars

May 19 — *"Management and versatility of fish as a laboratory animal model"*
Daniel J. Oestmann, Clinical Veterinarian, Research Respresentative, University of Nebraska-Lincoln, Institute Animal Care Program, Candidate, Courtesy Appointment in the department

May 26 — *"Diseases of Hamsters"*
James Hall, Director, Research Respresentative, University of Nebraska-Lincoln, Institutional Animal Care Program, Candidate, Courtesy Appointment in the department

September 8 — *"Characterization and immunogenicity of recombinant vesicular stomatitis virus expressing GP5 and M protein of porcine reproductive respiratory syndrome virus"*
Marillia Oliveira, DVM, Masters Thesis Graduate Student, Veterinary Epidemiology Research, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences, Lincoln, Nebraska

September 13 — *"Recruiting future food supply veterinarians"*
Jeff D. Ondrak, Candidate, Beef Cattle Clinical Veterinarian, University of Nebraska, Department of Veterinary and Biomedical Sciences, Great Plains Veterinary Educational Center, Clay Center, Nebraska

September 14 — *"Salmonella in beef and dairy"*
Dennis R. Hermesch, Candidate, Beef Cattle Clinical Veterinarian, University of Nebraska, Department of Veterinary and Biomedical Sciences, Great Plains Veterinary Educational Center, Clay Center, Nebraska

November 15 — *"Passive stay apparatus of the equine forelimb" and The challenge of gross anatomical instruction at veterinary schools in the 21st century"*
John R. Kammermann, Candidate,Veterinary Gross Anatomist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

November 28 — *"Morphological and functional studies of cells derived from post-natal neural stem like cells"*
Eric W. Rowe, Candidate,Veterinary Gross Anatomist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

November 30 — *"Strategies and vision for instruction in veterinary gross anatomy"*
Anthony O. Oluoch, Candidate,Veterinary Gross Anatomist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 4 — *"Educating tomorrow's food animal practitioners: A different perspective"*
Douglas E. Hostetler, Candidate, Veterinary Surgery/Anesthesiology, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 12 — *"Expression of pentraxin-related gene, rapidly induced by IL-lb (PTX3) in cattle and pigs"*
Carol Chitko-McKown, Candidate, Immunologist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 14 — *"Bridging and modulation of innate and adaptive immunity by mycoplasma superantigen MAM"*
Hong Hua Mu, Candidate, Immunologist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 19 — *"Naturally occurring regulatory T cells mediate genetic resistance to autoimmunity"*
NR Jayagopal (Jay) Reddy, Candidate, Immunologist University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 20 "Photic entrainment of circadian rhythms"
Gary E. Pickard, Candidate, Neurobiologist, University of Nebraska-Lincoln, Professional Program in Veterinary Medicine

December 21 *"Improving non-technical skills, knowledge, aptitudes, and attitudes (SKAS) in the veterinary profession"*
Dr. James Lloyd, Associate Dean for Budget, Planning and Institutional Research, Office of the Dean Administration, Michigan State University, College of Veterinary Medicine

US Meat Animal Research Center In-House Seminars (US MARC)

January 6 *"Expression of pentraxin-related gene, rapidly induced by IL-1 Beta (PTX3) in cattle and pigs"*
Dr. Carol Chitko-McKown

January 20 *"Genetic and environmental components of disease resistance"*
Dr. Gary Snowder

February 3 *"Management tools for livestock production systems"*
Dr. Roger Eigenberg

February 17 *"Control of zoonotic pathogen transmission from animal manures"*
Dr. Elaine Berry

March 3 *"Factors regulating fertility in beef cattle"*
Dr. Robert Cushman

March 17 *"STEC0157 as agri-food industry "bacterial weed"*
Dr. Jim Keen

April 7 *"US MARC twinning population: a unique resource for mapping production traits in cattle"*
Dr. Mark Allan

April 14 *"Inefficiencies in reproduction of postpartum sows"*
Dr. Tommy Wise

April 28 *"Heat stress in feedlot cattle"*
Dr. Tami Brown-Brandl

May 5 *"Variation in the genome of E. coli 0157:H7"*
Dr. Jim Bono

May 26 *"Early Innate Immune response to porcine reproductive and respiratory syndrome virus infection"*
Dr. Laura Miller

October 27 *"State of the US Meat Animal Research Center"*
Dr. Mohammad Koohmaraie

November 17 *"How do we increase the number of pigs weaned?"*
Dr. Jeff Vallet

December 1 *"A comprehensive genetic and physical map of the bovine genome"*
Dr. Warren Snelling

December 15 *"Reflecting on the past and gazing into the future of beef cattle genetics and breeding"*
Dr. Larry Cundiff

University of Nebraska
Great Plains Veterinary Educational Center
Teaching, 2006

Faculty -

Gary P. Rupp, DVM, MS, Dip. ACT
D. Dee Griffin, DVM, MS
Roger Ellis, BS, DVM, MS

Staff -

Romona Dana, Custodian II
Debbie George, Staff Assistant
Steve Johnson, Systems Analyst
Karen Shuck, CVT, Vet Tech II

Graduate Students -

Dennis Hermsch, BS, DVM, MS Student
Rolland Kramer, BS, DVM, MS Student
Rhomas Reece, BS, DVM, MS Student

SITUATION

The University of Nebraska, Great Plains Veterinary Educational Center (GPVEC) was established to provide education and clinical training for students in the professional curriculum and continuing education for graduate veterinarians. In addition to teaching, the faculty has been assigned appointments in research, extension and scholarly service. GPVEC is located at the U. S. Meat Animal Research Center, which provides an opportunity to work with the Herd Health Veterinarian to provide veterinary services for the livestock population and interaction with the ARS scientists. This unique program has been operational for nearly 20 years and it has initiated strong ties with Kansas State University, College of Veterinary Medicine, and the majority of other veterinary colleges in offering training to veterinary students, as well as practicing veterinarians on a national basis. A new cooperative program is currently under development with Iowa State University, College of Veterinary Medicine, which will offer new opportunities in teaching and research. GPVEC has gained national prominence in training students and veterinarians in food animal education and maintains a strong desire to expand and improve training opportunities in the future. To accomplish this goal will require addressing a wide array of important issues affecting our national food supply. The task will involve interactions and feedback with those directly involved in agriculture and the much larger majority of our population who have become isolated from production agriculture. We are all consumers interested in a sustainable future, but often with widely divergent ideas about the path to follow.

OUTCOMES - IMPACT

Short term

Increase and Improve the Entry Level Knowledge and Clinical Expertise of Graduate Veterinarians in Food Animal Practice - because of the vast expansion in knowledge, the number of services offered and the breadth of animal species addressed, the veterinary curriculum related to food animal/livestock practice has been severely compromised in the allotted time, course structure and clinical training. The trend in veterinary medicine, over several decades, has strong reflections

of human medicine with a major clinical emphasis shift to in-depth diagnostic, medical and surgical practices on individual animals, while the major need in food animal/livestock practice is a population health approach. This effort encompasses medical/surgical intervention, but goes significantly beyond to emphasize production-management concepts stressing disease prevention, herd management, nutrition, genetics, economics, marketing, food safety/wholesomeness and the environment.

Intermediate term

Increase Student Interest in Food Animal Practice - the number of graduate veterinarians with a strong desire to enter food animal practice has continually declined for more than a decade. This trend has developed in spite of an increasing number of students being admitted to veterinary colleges than ever before. Legitimate reasons for this appear to be: 1) a lower portion of students with livestock backgrounds being admitted; 2) fewer male students being admitted; 3) a feeling that a companion animal practice offers advantages such as improved working hours, higher earnings, less physical stress and better use of medical knowledge; 4) an improved cultural lifestyle in urban areas and 5) extended educational opportunities for children in large urban areas.

Increase the Number of Practitioners Trained in Beef Cattle Production Management - the beef cattle industry is in need of practicing veterinarians with advanced interdisciplinary skills in production management. This requires the training of skilled practitioners that posses the important herd health concepts of beef production and expanding their knowledge in management, nutrition, selection, economics and marketing. It also necessitates in-depth training in modern veterinary epidemiology, which addresses concepts of evidence-based medicine, data management, statistics, computer usage and information-based decision making. The recent evolution of modern veterinary epidemiology may be the best example of progress in veterinary medicine as it pertains to food animal practice, because it encompasses measures of production and performance to monitor disease and encourages information-based decision making.

Long term

Increase the Number of Veterinarians Interested in Research, Public Health, and Food Animal Practice - to advance the practice of food animal production management will require the development of new scientific information while constantly challenging current production practices. Encouraging outstanding students to pursue careers in research must be a significant part of our goals for improving future food animal veterinary medicine. The food industry must have a number of modern researchers with livestock backgrounds to answer questions essential for a future safe and wholesome food supply. Acceptance of students interested in training for careers in these areas appears crucial. Attracting graduate veterinarians back for postgraduate education is another viable source of researchers.

OUTPUTS

Who do we reach?

1. Prospective veterinarians - develop programs to reach junior high and high school students

interested in veterinary medicine in conjunction with local practitioners, teachers and agri-science educators.
2. Develop mentoring programs for entering veterinary students with an interest in food animals at all veterinary colleges and encourage future interactions with students to pursue frequent clinical and work experience with livestock operations and practitioners.
3. Provide continuing education and distance education for current practitioners interested in serving livestock producers to broaden and sharpen their services and education.
4. Maintain close contact with livestock producers and listen to their needs and encourage them to optimize the veterinary services offered by cutting-edge practitioners.
5. Work with food industry purveyors and develop cooperative efforts to provide the safest and optimum production, processing and handling practices for livestock products.
6. Work closely with governmental agencies such as FSIS and APHIS to train future veterinarians for work in public health, epidemiology and food safety.
7. Consumers - everyone is a consumer, but it is essential to make an extended effort to educate the consumers not directly involved in the agriculture/livestock industries about scientific facts of food safety, wholesomeness, human and animal health and how systems function in production, processing and handling our food supply. In addition, the spin-off areas such as environmental concerns, sustainability of natural resources, use of modem technology to control plant and animal diseases and the importance of future biotechnology to develop new genetically superior plants and animals.

What do we do?

1. Change to a more pro-active approach in selecting future prospective food animal veterinarians.
2. Follow up with students to mentor them during their professional curriculum and develop strong background experiences in livestock production.
3. Develop interdisciplinary skills in students by working with other specialists and having them actively involved in teaching and clinical experiences.
4. Offer easily accessible training - classes, electives, workshops, demonstrations and/or distance education updates.
5. Provide re-treading opportunities for veterinarians wanting to change/improve/increase their professional capabilities.
6. Develop CDs and DVDs for specific areas of training that can be conveniently accessed when time is available for self-study.

What is the educational product?

1. New curriculum emphasizing clinical/hands-on training (multi-institutional faculty and students)
2. Case studies (offered over internet, polycom or DVDs)
3. Publications and interactive web page (available between institutional resources)
4. Future training - multi-site, multi-institutional, multi-disciplinary

Inputs

What we invest - faculty, philosophy, staff, planning, transportation, training material, resources, time and partners (other specialists/practitioners/producers/managers/collaborative faculty)

Assumptions

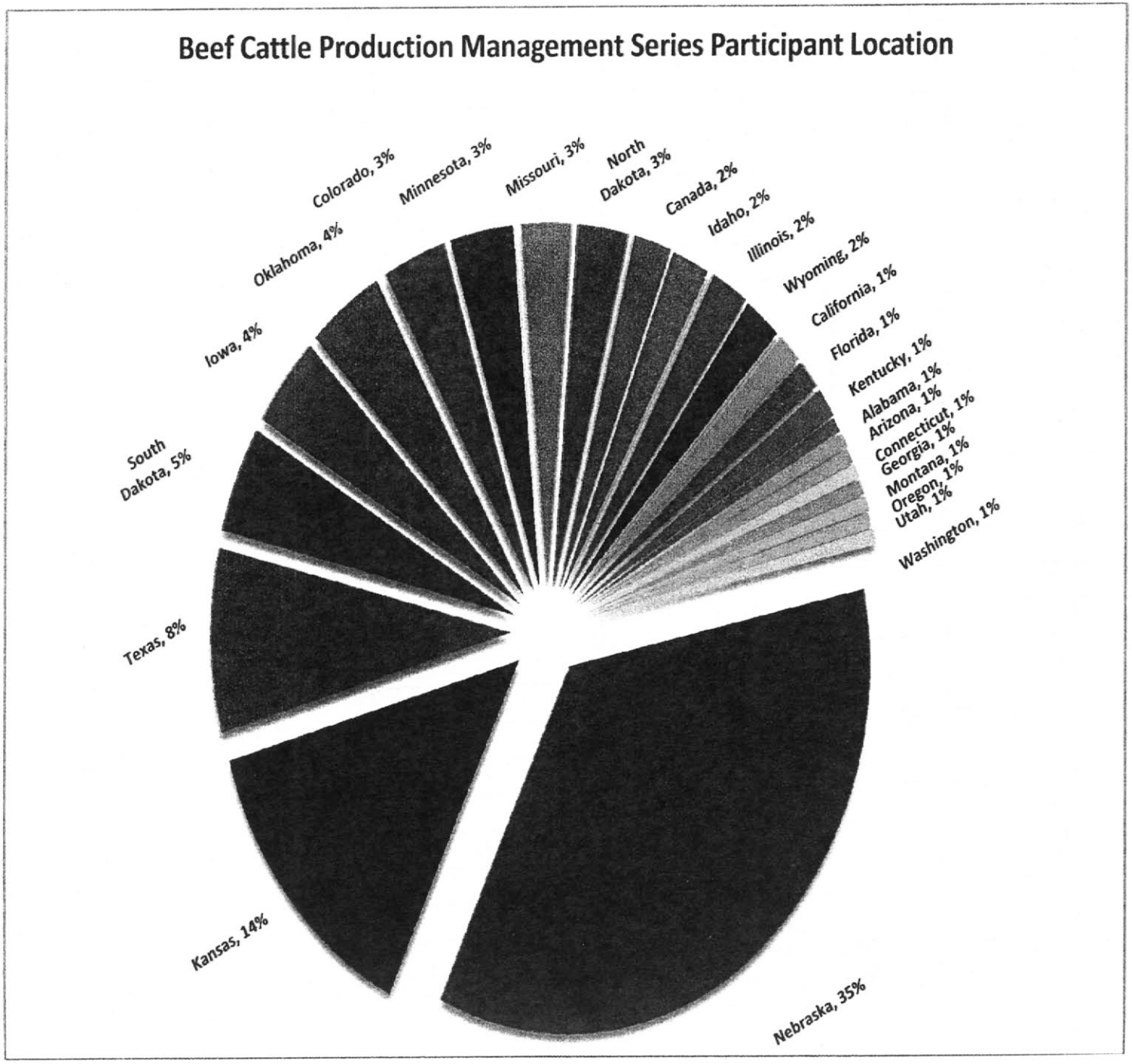
1. Review previous teaching/training efforts and make use of successful ones
2. We will be working with old attitudes and skeptics
3. Develop new resources/approaches and commitment
4. Enlist successful BCPMS graduates that are good role models (the doers that make-it-happen)

Environment

"We are what we most commonly do, therefore, excellence is not an act but a habit" (Aristotle)
Producer attitudes

Beef Cattle Production Management Series 1993-2005

		Series I	Series II	Series III	Series IV	Series V	Series VI	Series VII	Series VIII	
		1993-94	1994-95	1995-96	1996-97	1998-99	1999-00	2001-02	2004-05	TOTAL
1	Alabama					1				1
2	Arizona					1				1
3	California			1					1	2
4	Canada			2	1					3
5	Colorado					1	2	2		5
6	Connecticut								1	1
7	Florida							1	1	2
8	Georgia			1						1
9	Idaho	1	1		1					3
10	Illinois	2			1					3
11	Iowa	1	1	2			2			6
12	Kansas	4	2	3	1	2	2	2	4	20
13	Kentucky					1		1		2
14	Minnesota		2	1	1				1	5
15	Missouri		1	1					2	4
16	Montana			1						1
17	Nebraska	7	7	6	8	4	9	4	7	52
18	North Dakota		1				1	2		4
19	Oklahoma	1	2	1				1	1	6
20	Oregon					1				1
21	South Dakota	1	2		2	1	1			7
22	Texas	2			1	4	1	2	2	12
23	Utah		1							1
24	Washington	1								1
25	Wyoming			1		1	1			3
	TOTAL	20	20	20	16	17	19	15	20	147


Beef Cattle Production Management Series Participant Location
Colorado, 3%
Minnesota, 3%
Missouri, 3%
North Dakota, 3%
Canada, 2%
Idaho, 2%
Illinois, 2%
Wyoming, 2%
California, 1%
Florida, 1%
Kentucky, 1%
Alabama, 1%
Arizona, 1%
Connecticut, 1%
Georgia, 1%
Montana, 1%
Oregon, 1%
Utah, 1%
Washington, 1%
Oklahoma, 4%
Iowa, 4%
South Dakota, 5%
Texas, 8%
Kansas, 14%
Nebraska, 35%

UNL - GPVEC Student Enrollment 1990-2007

	University Represented	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	00-02	02-03	03-04	04-05	05-06	06-07	TOTAL
1	Kansas State University	99	110	158	128	143	150	151	161	163	153	247	236	148	141	159	169	57	2573
2	Auburn											2							2
3	University of California-Davis		6	8	3	2	8	12	2	2		2							45
4	Colorado State University								2										2
5	Cornell University			1	1					2				3					7
6	University of Florida		8	4	11			2											25
7	University of Georgia		2	2						4	5								13
8	University of Guelph			2	2		1											2	7
9	University of Illinois	12	3	1	23	12	24	11	13			4	6	4					113
10	Iowa State University		1	2	5	8	6	10	2	6		2	2	8		9	2	59	122
11	Louisiana State University			2	18	2		2					6		3				33
12	Michigan State University	6	11		8	7	5	3	5		9			2		6	4		66
13	University of Minnesota		5	16		6	4	6	1	2	2	3	4	4	5	6		2	66
14	Mississippi State University				8	19								2				3	32
15	University of Missouri		9	1	1									1		1		1	14
16	North Carolina State University					6	4	5	8						2				25
17	Ohio State University	9			4					2		1		2				2	20
18	Oklahoma State University	6	1	7	1	19	6	3	2			1	3	1	1				51
19	Oregon State University														2				2
20	University of Pennsylvania						4	5		2	4	6		1					22
21	Purdue University		2	2	2	1					1			1		5		1	15
22	University of Saskatchewan			2	3														5
23	Texas A&M University	3			3	8	9	17	2		1							2	45
24	Tufts University		3	4				1					1	1					10
25	Tuskegee University													1					1
26	Virginia - Maryland University				12	4	14		2	2	2			9	4		1	2	52
27	University of Wisconsin				1					1			3					4	9
28	Washington State University			1							1	1	2						5
29	Western University																	6	6
30	St. George's University															1			1
	TOTAL	135	161	213	234	237	235	228	200	186	178	269	263	188	158	187	176	141	3389

PEW Food Animal Production Medicine Consortium - program ended 1998

2007-2008 Electives

University of Nebraska
Great Plains Veterinary Educational Center

Elective	Dates Offered	Student Enrollment
Lambing	May 14-18, 2007	1
	October 1-5, 2007	1
	January 7-11, 2008	1
	January 14-18, 2008	1
	February 4-8, 2008	1
	February 11-15, 2008	1
	March 10-14, 2008	1
Fall Calving	August 13-18, 2007	3
	August 20-25, 2007	3
Weaning Management	September 10-14, 2007	4
Feedlot Production Management and Health Consulting	September 24-28, 2007	4
	October 1-5, 2007	4
	October 8-12, 2007	4
	October 15-19, 2007	4
	February 4-8, 2008	7
Pregnancy Examination	October 9-12, 2007*	4
	October 15-19, 2007	4
	October 22-26, 2007	4
Bovine Reproduction	October 29 - November 2, 2007	10
Spring Calving	March 3-8, 2008	4
	March 10-15, 2008	4
	March 17-22, 2008	4
	March 24-29, 2008	4
Clinical/Calving	March 31 - April 5, 2008	3
	April 7-12, 2008	2
	April 14-19, 2008	2
Bull Breeding Soundness	April 21-26, 2008	5
Special Studies	Available Upon Request / Approval	

7-31-06

*Due to Federal Holiday on Monday, this elective will begin on Tuesday.

Department of Veterinary and Biomedical Sciences
2006 Research Program

All Department faculty are involved in some research activity, either as project leaders or as contributors to research teams. Some faculty members have designated appointments in research. As a part of this appointment, they prepare research project descriptions which are peer-reviewed through a process established by the Agricultural Research Division (ARD) and assigned ARD Research Project numbers. Through an extension of this same process, projects can be approved by the USDA Cooperative State Research Services for matching federal funds, including Hatch, Regional Research or Animal Health Research Formula Funds. As a matter of USDA policy, competitive research grants from the USDA are assigned separate ARD project numbers. Several projects are assigned ARD numbers for administrative and budget management purposes even though they are not specifically research projects, e.g., the Nebraska SPF Swine laboratory project (NEB 14-029) and the Nebraska Veterinary Diagnostic Laboratory System project (NEB 14-059). Research projects funded by the UNL Center for Biotechnology or other external sources are not required to go through the ARD Research Project review process.

Faculty Research Interests

♦**Barletta, Raúl G.**	Molecular genetic bases of bacterial pathogenesis and drug resistance, mycobacterial infections in cattle (Johne's disease) and human beings (tuberculosis, *M. avium* infections)
♦**Brodersen, Bruce W.**	Pathogenesis of bovine viral diarrhea virus; diagnostic pathology
♦**Doster, Alan R.**	Ultrastructural changes in the lung produced by bacteria, viruses and pneumotoxic compounds
♦**Duhamel, Gerald E.**	Pathogenesis of enteric diseases caused by spirochetes and rotavirus; primarily *Brachyspira pilosicoli* and bovine rotavirus
♦**Griffin, D. Dee**	Beef cattle production medicine, especially respiratory disease in feedlot cattle
♦**Jones, Clinton J.**	Regulation of viral gene expression and persistent herpesvirus infections; mechanisms of chemical and viral carcinogenesis.
♦**Kelling, Clayton L.**	Pathogenesis of viral diseases, primarily bovine respiratory syncytial virus and bovine viral diarrhea virus infections

♦**Lou, Marjorie F.**	Biochemical mechanism of senile cataract formation: controls of cellular thiol/disulfide homeostasis
♦**McVey, D. Scott**	Understanding of virulence mechanisms of bacterial pathogens of food producing animals, with particular emphasis on elucidating the mechanisms by which bacteria infect and persist in tissues.
♦**Moxley, Rodney A.**	Pathogenesis and control of *Escherichia coli* infections in swine and cattle; on-farm control of *E. coli 0157:H7* prevalence in beef cattle (food safety)
♦**Osorio, Fernando A.**	Pathogenesis of persistent viral infections including persistent reproductive and respiratory syndrome (PRRS) virus and herpesvirus latency; vesicular diseases
♦**Pattnaik, A. K.**	Transcription, replication and assembly of RNA viruses; viral pathogenesis; interferons and antivirals
♦**Rogers, Douglas G.**	Pathogenesis of chlamydial infections in livestock
♦**Rupp, Gary P.**	Effect of production practices and management on beef cattle diseases and enterprise profitability
♦**Smith, David R.**	Food safety through study of on-farm prevalence and control of *E. coli 0157:H7* in beef cattle; epidemiologic approaches to study of livestock diseases
♦**Somerville, Greg A.**	Metabolic and environmental regulation of staphylococcal pathogenesis. Redox-dependent regulation of virulence factor synthesis
♦**Steffen, David J.**	Diagnosis and characterization of genetic and congenital diseases of cattle

Department of Veterinary and Biomedical Sciences
Agricultural Research Division (ARD)
Research Projects, 2006

ARD Project #	Project Title (Researchers)	Expiration Date
14-039	SAES/NEB/STATE HATCH PROJECT (0096920): Research Laboratories and Animal Care Facility (Departmental)	Indefinite 12/21/2020
14-059	STATE HATCH PROJECT (0153376): Vet Diagnostic Lab System: Diagnostic Surveillance & Disease Investigation in Nebraska Livestock & Poultry (Veterinary Diagnostic Center Faculty)	Indefinite 12/21/2020
14-115	CSREES/USDA (0187737) (Hatch Project/NC-229): Porcine Reproductive and Respiratory Syndrome (PRRRS) (F. A. Osorio)	Revised 09/30/2009
14-117	CSREES/NEB/NRI Comp Grant (0189498) Role of A/E Proteins in E. Coli O157:H7 Intestinal Colonization of Adult Cattle (R. A. Moxley)	Extended 12/14/2006
14-118	CSREES/USDA Animal Health (0190103): Pathobiology of Porcine Colonic Spirochetosis Caused by Brachyspira Pilosicoli (G. E. Duhamel)	Extended 08/31/2007
14-119	CSREES/NEB (0190910): Functional Genomic Analysis of Bovine Viral Diarrhea (R. O. Donis)	Extended 12/31/2005
14-121	CSREES/NEB (NC-107/Hatch Project) (0192733): Evolving Pathogens, Targeted Sequences, and Strategies for Control of Bovine Respiratory Disease (C. J. Jones/S. Srikumaran)	10/09/2006
14-123	CSREES/NEB (0192972) Develop Pre-Harvest Version of the USDA-FSIS Fast Antibiotic Screening Test and Antibiotic Residue Avoidance Education (D.D. Griffin)	Extended 09/14/2007
14-125	CSREES/NEB (NC-1007 Hatch Project) (0005609): Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety (R. A. Moxley, G.E. Duhamel, D. R. Smith)	09/30/2007
14-126	CSREES/NEB (Animal Health) (0194929) Pathogenesis of Bovine Viral Diarrhea Virus and Bovine Respiratory Syncytial Virus Infections (C. L. Kelling)	09/30/2007
14-127	SCREES/NEB/NRI Comp Grant (0196793) Intervention Strategies to Reduce Escherichia Coli O157:H7 in Beef Feedyards (D. R. Smith)	Extended 09/14/2007
14-128	CSREES/NEB/NRI Comp Grant (0198063) Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related (LR) Gene (C. J. Jones/A. R. Doster)	12/14/2006

ARD Project #	Project Title (Researchers)	Expiration Date
14-129	CSREES/NEB/NRI Comp Grant (0199138) Molecular Analysis of a Mycobacterium Paratuberculosis Colony-Morphology Attenuated Mutant (R.G. Barletta. C. J. Czuprynski)	Extended 01/31/2007
14-130	CSREES/NEB Animal Health (0199447): Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related (LR) Gene (C. J. Jones)	09/30/2008
14-131	SAES/NEB/State (0199961) Veterinary Field Disease Research Program (D. R. Smith)	04/30/2009
14-132	CSREES/NEB Hatch Project (0200658): Examination of Attenuation and Virulence Determinants of Porcine Reproductive and Respiratory Syndrome Virus (A. K. Pattnaik/F. A. Osorio)	06/30/2009
14-133	CSREES/NEB/ NRI Comp Grant (0200538): Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach (A. K. Pattnaik, F. A. Osorio)	08/31/2007
14-134	CSREES/NEB/NRI Comp Grant (0201032): Influence of Enterotoxins on Virulence and Colonization of the Porcine Intestine by *Escherichia coli* (R. A. Moxley)	Extended 08/31/2007
14-136	HATCH (0204923): Tricarboxylic Acid Cycle Mediated Regulation of Staphylococcus Aureus Virulence Factors (G. A. Somerville)	02/28/2010
14-137	SAES/NEB/State (0203810) Genetic Basis of Resistance to Food-Borne Bacterial Pathogens (G. E. Duhamel, J. S. Weber)	06/30/2007
14-138	CSREES/NEB/NRI Compet. Grant (0204665) Functional Analysis of BICPO, the Major Transcriptional Regulatory Gene of Bovine Herpesvirus 1 (BHV-1) (C. J. Jones)	09/14/2008
14-139	NRI Competitive Grant (0204702) Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virue of the Study of PRRSV Pathogene (F.A. Osorio, A. K. Pattnaik)	08/31/2007
14-140	CSREEs Grant (0205221) Stimulating the Development of Veterinarians to Serve Rural America (D.D. Griffin)	09/14/2007
14-141	Animal Health (0205570) Molecular Genetic Analysis of Mycobacterium avium subsp. Parathuberculosis (MAP) and related mycobacterial pathogens (R.G. Barletta)	09/30/2010
39-142	State (0207398) Development of Broad-Spectrium Antibiotics Against Bacterial Pathogens (R.G. Barletta, R. Powers, J.M. Takacs)	06/30/2008

ARD Project #	Project Title (Researchers)	Expiration Date
39-143	NRI Competive Grant (0207841) Functional Analysis of Proteins Encoded by the Bovine Herpesvirus 1 (BHV-1) (C.J. Jones)	09/14/2009

Department of Veterinary and Biomedical Sciences

2006 ARD Research Projects Progress Summaries

Biochemical Mechanism of cataract formation: Oxidative stress, thiol regulation and cataract models Investigator

Marjorie F. Lou

Our focus on the biochemical mechanism of age-related cataract formation is oxidative stress. We used hydrogen peroxide-induced cataract in organ culture condition as our model to study the progressive changes in morphology and intracellular redox potential in the lens. We demonstrated that lens opacification is associated with the increased protein insolubility and protein aggregation, resulting from lens protein oxidation by oxidative stress. We also showed that the thiol groups in lens proteins are oxidized by forming protein-thiol mixed disulfides (protein thiolation) followed by protein protein disulfide formation, a condition that will lead to lens opacification. We discovered that this deleterious process could be reversed or delayed if cataract formation is at an early stage, such as removal of the oxidant. The most drastic recovery is the reversal of the thiolation of lens proteins. Therefore, we speculate that the lens must possess some repair systems that can protect it against pathological consequences. We have found two of such repair systems, one is the glutathione-dependent thioltransferase system, which is a cytosolic enzyme and can specifically dethiolate protein-s-s-glutathione. The other is the NADPH-dependent thioredoxin system, which in conjunction with thioredoxin reductase and NADPH can reduce protein-protein disulfides. We have cloned the thioltransferase gene and the thioredoxin gene, purified the recombinant enzyme/protein for their respective functional studies. Both enzyme/protein are very resistant to oxidation and have a characteristic, conserved sequence of CXXC at their active sites. Both systems are proven to have the ability to restore the activities/functions of other oxidation-inactivated enzymes/proteins using human lens epithelial cells pretreated with hydrogen peroxide as a model. Furthermore, genes for thioltransferase and thioredoxin have been shown to upregulate under oxidative stress conditions, a phenomenon of adaptive response by the cells to combat the stress.

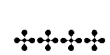
A secondary function of thioltransferase has been confirmed to be an ascorbate-recycling enzyme, which is able to reduce the oxidized ascorbate, dehydroascorbate, to return to the reduced form of ascorbate. This is extremely important finding, as the lens is rich in ascorbate, which along with vitamin E, contributes to the protection of membrane lipids. Ascorbate is also needed for other metabolic functions of various enzymes. The oxidized ascorbate, if not reduce in time can form glycation products with lens proteins and lead to high molecular weight aggregates. The catalytical function of thioltransferase in recycling ascorbate is first evidence that an enzyme is involved in reducing dehydroascorbate, against the dogma of a nonenzymatic recycling process.

Lastly, the mitochondrial-specific TTase (Grx2), which we co-discovered recently with Dr. Gladyshev of Biochemistry Department, has been shown to present in the mitochondria of human lens epithelial cells. It possesses duel activities of dethiolase and dehydroascorbate reductase, similar to the cytosolic thioltransferase enzyme. We are pursuing the task of proven the physiological function of Grx2 in 2the mitochondria

RESEARCH PROJECT SIGNIFICANCE & IMPACTS

Based on our research results, the concept of oxidative stress-induced cellular damage as one of the major factor for cataractogenesis continue to gain momentum and has escalated our scholarly standing in the eye field as well as outside of the lens research. One of such impact is the founding of the Redox Biology Center at UNL upon receiving the NIH award of ten million dollar for the Cobra grant. My role of being one of the five senior advisors may have contributed to the success of the funding. The other impact is

our discovery of the involvement of thioltransferase in the recycling of ascorbate. These results when reported at our annual national eye meeting last year, sent shocking wave to those scientists working in this area. A collaboration by the request from one of these scientists resulted in one manuscript just now completed. A third impact is my recognition and honor extended from Oxford University in England as a Leichfield Lecturer (2002-2003), and a subsequent invitation by the editor from the Oxford University to contribute a review article based on my work in this area for the series of Progress of Retina and Eye Diseases



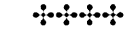
The Role of Reactive Oxygen Species (ROS) in Maintaining the Health of Lens Cells: The Redox Signaling Investigator

Marjorie F. Lou

We have been concentrating in the redox signaling this year after publishing three manuscripts describing the basic signaling pathways in the lens and how diabetic condition can alter the cell signaling. We have been very successful in demonstrating that reactive oxygen species, which may be harmful to the cells/ tissues, but at low level (nanomolar range) can be stimulants for various cell functions, including cell proliferation, via signal transduction pathway. It has been discovered and reported in other tissues/cells that certain growth factors such as PDGF, EGF are functional mitogens because they can stimulate ROS generation endogenously upon binding with the receptors on the cell surface. We have demonstrated with confocal microscopy that fluorescein preloaded into live human lens epithelial cells can generate fluorescence upon PDGF stimulation. The generated fluorescence can be quenched by cells preloaded with catalase enzyme or antioxidants, confirming our speculation that the lens cells have an ability to produce ROS in situ. Additionally, we have shown that exogenous hydrogen peroxide can mimic PDGF and produce similar effect, including activation of a battery of cell signaling proteins, followed by gene expression and eventual cell proliferation. We also showed that the lens cells possesses the membrane-bound enzyme NADPH oxidase, which can generate superoxide ion upon stimulation by arachidonic acid or hydrogen peroxide.

RESEARCH PROJECT SIGNIFICANCE & IMPACTS

A new physiological function of reactive oxygen species is identified as redox signaling, which is a process to mediate the function of certain growth factors for cell function. This finding has raised tremendous interest in the lens community. We have definitely being regarded as the laboratory working in the leading edge of lens research.



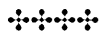
NEB 14-039
Research Laboratories and Animal Care Facility (Department/ARF)

This past year, the Animal Research Facility (ARF) has provided housing for 2,039 animals, by species as follows: 30 Blue Winged Teal Ducks; 15 goats; 48 cows; 6 Xenopus frogs; 1,404 mice; 441 pigs; 53 dogs; 40 hamsters and 2 rabbits. The Animal Research Facility replaced, upgraded and purchased new equipment, such as feed storage barrels, transport carts, storage racks and animal restraint devices, including halters and snares. The Animal Research Facility also increased its rodent cages to a capacity of approximately 100% over the previous year by acquiring new rodent cages and supplies. The floors in rooms B-1, B-2, B-3, B-4, B-5 and G-6 were resealed, making them more suitable for housing companion animals and small laboratory animals. Due to the increased use of the surgical suite for companion animal surgeries, the Animal Research Facility acquired a new isoflourane

vaporizer, a large number of small animal surgical instruments, such as huck towels, drapes, incubation tubes, rebreather bags and medications suitable for use in small and companion animals. The Animal Research Facilities completed the caulking around the floors in the surgery preparation room to ensure an adequate seal. The outside (non-brick portion) of the Animal Research Facility was repainted and the lettering on the outside doors was replaced with new stencils.

IMPACT STATEMENT

The Animal Research Facility staff contributed to a variety of research projects on animal diseases at UNL, by supporting many research projects for VBMS faculty members. The ARF staff also supported many investigators in other departments at UNL. The Animal Research Facility staff also supported projects for private industry; thereby, assisting in the development of new commercially available animal health care products. The Animal Research Facility is also providing some temporary housing for research animals from the Dental College while the Dental College animal housing is being upgraded/ renovated. The Animal Research Facility also participates in public relations and educational ventures, including the Nebraska State Fair, Birthing Pavilion.



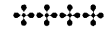
NEB 14-059
Veterinary Diagnostic Laboratory System: Diagnostic Surveillance & Disease Investigation in Nebraska Livestock & Poultry (Veterinary Diagnostic Center)

The lab received 15,330 requests for diagnostic assistance from producers. Foreign animal diseases are included in the differentials and excluded based on laboratory examination or clinical data. We assist state health officials with monitoring programs for M paratuberculosis, avian influenza, newcastle disease, classical swine fever, CWD and West Nile virus. A serologic survey of West Nile exposure and risk factors in dogs is in progress. Equine serologic response to West Nile was studied and a poster presented with the findings. Testing for BVDV PI status was performed on 178,000 calves. Positive animals are removed from production to prevent spread of virus. This is the third year of the CWD prevalence study in Nebraska and results should be summarized for publication next year. We continued to support a study of Johnes prevalence in Nebraska as a representation of prevalence in extensive beef cattle operation of the Great Plains and the monitoring program to reduce the incidence of Johnes disease. We investigated the prevalence or Neospora caninum in Nebraska deer and demonstrated that a deer coyote cycle may exist with infection occasionally spilling into beef cattle populations. Prevalence in deer was estimated at 2-5%. Outbreaks of abortion related to Neosporosis were investigated and one herd with vaccine failure was investigated to characterize risk factors that may have contributed to the increased abortion in the face of vaccination. Dwarfism investigations continued and DNA samples were shared with ISU for genetic analysis. A putative site was found on chromosome 6 associated with the trait. A detailed investigation of Kochia and Rumex intoxication provided data on outcomes that will be useful to educate producers faced with similar exposure issues. Investigations into deaths of wildlife and zoo animals led to recognition of Tsukamurekka Pulmonis as a new differential for granulomatous disease in zoo mammals. Health, reproductive status, and agricultural chemical exposure were accessed in river otters.

IMPACT STATMENT

BVDV infections rate at 1% means over 1,700 persistently infected calves, the reservoir for virus were eliminated from production facilities. West Nile testing supported state wide monitoring and control programs and

significant decreases in animal and human infections were reported in 2003. Studies in horses demonstrated the reduced utility of IgM serology in endemic regions. It appears IgM response is muted in clinical infections from vaccinated and previously exposed animals. Routine surveillance testing supports free movement of livestock products across state and national boundaries and identifies endemic diseases providing useful data for management and treatment of diseases that affect livestock profitability. The CWD and Johnes surveys will provide base line statistically valid prevalence data for the state so that effectiveness of intervention can be measured. Identification of and publications describing, emerging diseases of domestic and wild animals aids those responsible for animal health in humane management of those resources.



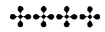
NEB 14-115
Porcine Reproductive and Respiratory Syndrome (PRRRS) (FA Osorio)

Using reverse genetics, we generated a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a highly virulent infectious clone (FL-12). Eight viable chimeric viruses, encompassing the entire genome of PRRSV (Prime Pac), have been obtained. Five of these chimeras include all the non-structural open reading frames (ORFs): Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non-structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions of the PRRSV genome could be ruled out as important determinants of virulence. We further dissected the structural regions for a finer mapping of individual ORFs of the PRRSV genome and generated 5 more chimeric viruses representing the majority of each individual ORF, 3 through 7. Three putative N-linked glycosylation sites (N34, N44, and N51) are located on the GP5 ectodomain, where a major neutralization epitope also exists. To determine which of these putative glycosylation sites are used in PRRSV life cycle and the role of the glycan moieties in induction of neutralizing antibodies, we generated a panel of GP5 mutants containing single and multiple amino acid substitutions at these sites. In serum neutralization assays, the mutant viruses exhibited enhanced sensitivity to neutralization by wt PRRSV-specific antibodies. Furthermore, inoculation of pigs with the mutant viruses induced significantly higher levels of neutralizing antibodies against the mutant as well as the wt PRRSV, thus suggesting that the loss of glycan residues in the ectodomain of GP5 enhances both the sensitivity of these viruses to in vitro neutralization as well as the immunogenicity of the nearby neutralization epitope. These results should have great significance for development of PRRSV vaccines of enhanced protective efficacy. This study is aimed at identifying PRRSV B-cell linear epitopes that would be consistently recognized by the humoral immune response of naturally infected animals. To this end, 213 overlapping 15-mer synthetic peptides covering the whole amino acid sequence of a non-structural protein (nsp2) and all the structural proteins of a North American strain of PRRSV (NVSL97-7895) were used in a peptide-based enzyme-linked immunosorbent assay. Interestingly, the Nsp2 was found to contain most linear epitopes when compared to the structural proteins. Analysis of the peptides spanning the amino acid sequence of all structural proteins of the NVSL97-7895 strain against convalescent sera (45dpi) revealed the presence of B-cell linear epitopes in all studied proteins. Despite a genetic diversity between different PRRSV genotypes (1), we found immunodominant epitopes in specific regions of the gp2, gp3, gp5 and M protein which has been previously demonstrated to be recognized by immune sera raised against an European strain of

PRRSV.

IMPACT STATEMENT

The experiments dealing with reverse genetics using an infectious Cdna clone are significant to understand the virulence of PRRSv and its attenuation. Understanding the gene basis for the virulent phenotype of PRRSV is the basis for the development of new, safer, more rationally designed replicating vaccines. In addition, the identification of epitopes (small fragments) of PRRSV proteins that can be inactivated or eliminated from a live PRRSv may be the basis for the development of a marker vaccine. Along the same line, enhancement of the PRRSV- neutralizing antibody response by molecular modification of the PRRSV proteins is of high value for the development of more effective vaccines against PRRSv infections.



NEB 14-117
Role of A/E Proteins in *E. Coli 0157*:H7 Intestinal Colonization of Adult Cattle (RA Moxley)

Escherichia coli O157:H7 is an important zoonotic pathogen, and prevention of infection in cattle has been proposed to reduce the risk of human disease. The outer membrane protein, intimin has been reported to enhance intestinal colonization of adult cattle; however, the importance of Tir (translocated intimin receptor) in this regard has not been addressed. Adult beef cattle (n=30, average age, 16 mo) were orally inoculated with one of 5 isogenic strains of *E. coli O157:H7*, including: (1) tir gene deletion mutant; (2) complemented mutant; (3) tir gene deletion mutant transformed with empty vector; (4) nalidixic acid resistant (NalR) parent; and (5) wild-type (WT). Prior to the first inoculation (C1), all cattle were seropositive by ELISA for antibodies to intimin, Tir, EspA, EspB and O157 LPS. Forty-two days after the first inoculation (42 DPC1), all animals were re-challenged (C2) with the NalR parent strain to test whether prior infection with a Tir+ strain had any effect on shedding. At 14 DPC1, the WT strain was shed in the feces at higher levels than the other challenge strains, whereas shedding of the complemented mutant and NalR parent strains was comparable to that of the tir gene deletion mutant strain. No increase in anti-Tir titer was detected following C1 with either the Tir- strains or NalR parent strain. In contrast to those inoculated at C1 with the WT and NalR strains, cattle inoculated with either the tir gene deletion mutant or complemented strains at C1 had an increase in the magnitude and duration of NalR bacterial excretion at 14 DPC2, although the difference was not statistically significant ($P>0.05$). Overall, C1 challenge with WT resulted in higher post-C1 anti-Tir and anti-O157 LPS titers compared to the complemented mutant and NalR parent strains, which resulted in low or no detectable anti-Tir immune response. These results suggest that serologically detectable responses to Tir are associated with the level of intestinal infection; however, more studies will be required to determine the relative importance of Tir for *E. coli O157:H7* colonization of the adult bovine gastrointestinal tract.

IMPACT STATEMENT

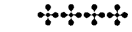
The results of this study provide a basis for the development of effective pre-harvest intervention strategies for reduction of the prevalence of *E. coli O157:H7* in feedlot cattle. Reduction of *E. coli O157:H7* in cattle should result in reduced environmental and food-borne contamination with the organism, thereby reducing the incidence of infection in humans.

NEB 14-118
Pathobiology of Porcine Colonic Spirochetosis Casued by Brachyspira Pilosicoli (GE Duhamel)

Brachyspira pilosicoli is a major cause of colonic spirochetosis, a polymicrobial inflammatory bowel disease that affects humans and a wide range of animal species. Five penicillin-binding proteins were identified among human and porcine *B. pilosicoli* strains. Cecal spirochetosis and typhlitis associated with *B. pilosicoli* was characterized in 7.5- to 18-week-old commercial turkeys for the first time. Enterohepatic Helicobacter species, including the prototype *H. hepaticus*, are emerging causes of intestinal diseases in humans and animals that produce a novel nuclease toxin, known as cytolethal distending toxin (Cdt). A sensitive fluorometric assay was developed to assess the biochemical properties of the CdtB effector subunit. The Ca2+- and Mg2+-dependence and neutral properties of CdtB were similar to mammalian nucleases, but DNA hydrolysis by CdtB was approximately 100-fold less active and was considerably more resistant to inhibition by ZnCl2 and G-actin than mammalian nucleases. Similar to other gram negative pathogens, the CdtB subunit of *H. hepaticus* localized to the nucleus and alone was sufficient for cellular intoxication. Comparative analysis of CdtB genes and toxins produced by *C. jejuni*, a major cause of food-borne diarrheal illnesses, *C. hyointestinalis*, an emerging cause intestinal diseases in pigs and human beings, and *C. coli* commonly found in intestinal specimens obtained from pigs and other species provided new insights into the pathogenesis of intestinal disease associated with these pathogens and methods for improved detection. By contrast with a recent report suggesting high CdtB activity among *C. coli* isolated from pigs in Denmark, CdtB activity was not found among US porcine *C. coli*.

IMPACT STATEMENT

Identification of penicillin-binding proteins of *B. pilosicoli* provides a basis for development of improved control strategies for pathogenic intestinal spirochetes of humans and animals. Cecal spirochetosis caused by *B. pilosicoli* was characterized in commercial turkeys for the first time. Differences between the biochemical properties of Helicobacter CdtB and mammalian nucleases suggest that novel antitoxin control strategies can be developed. A novel Campylobacter cdtB gene encoding a highly toxic CdtB subunit was characterized among porcine and human *C. hyointestinalis*. Porcine *C. coli* are an unlikely source of toxigenic Campylobacter for humans.



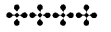
NEB 14-119
Functional Genomic Analysis of Bovine Viral Diarrhea (RO Donis)

Bovine viral diarrhea virus (BVDV), a pestivirus, is a pathogen that is economically important to the cattle industry primarily because of its propensity to cause viremia resulting in fetal infection or immunosuppression. Effective, safe BVDV vaccines that induce protective immunity without causing fetal infection or immuno-suppression are needed. Inhibition of cellular innate immunity by pestiviruses correlates with the presence of a nonstructural protein, at the 5 prime terminus of the open reading frame. This N-terminal protein (NPRO) is an autoproteinase. We hypothesized that BVDV virulence also correlates with the presence of N.PRO The objective of the present study was to characterize the influence of NPRO on BVDV virulence in calves. The virulence of a noncytopathic NADL BVDV with a functional N PRO [i-NADL.del (ins)] was compared with the virulence of i-NADL.del (ins) with a dysfunctional NPRO as a result of fusion with EGFP [i-NADL.del (ins)-EGFP] by experimentally infecting dairy calves with each virus. Calves infected with i-NADL.del (ins) developed elevated body temperatures, viremia, as well as marked lymphoid depletion and extensive deposition of BVDV antigen in lymphatic tissue. Calves infected with i-NADL.del (ins)-EGFP developed low-level viremia, and mild lymphoid depletion with minimal BVDV antigen

deposition in lymphatic tissues. These results provide evidence for a correlation of BVDV virulence with the presence of a functional N.PRO Studies are underway to assess host innate and adaptive immune responses as well as the level of protective immunity afforded by vaccination of calves with this attenuated, noncytopathic BVDV mutant.

IMPACT STATEMENT

BVDV infections have a significant negative impact on animal well-being and profitability in the US cattle industry. BVDV vaccines are available to help control those infections; however, the vaccines do not provide complete protection. Our research on the molecular basis of virulence contributed to the understanding of mechanisms involved in BVDV infections and will facilitate research aimed at identifying safe, effective vaccine candidates.



NEB 14-121

Evolving Pathogens, Tareted Sequences, and Strategies for Control of Bovine Respiratory Disease (CJ Jones and S Srikumaran)

BHV-1 is a significant viral pathogen of cattle that can induce respiratory disease, abortion, or occasionally encephalitis. BHV-1 is also frequently found in buffalo, which is a growing food animal source in the US. BHV-1 is also a causative agent of "Shipping Fever" or Bovine Respiratory Complex. As a consequence of the pathogenic potential of BHV-1 and Bovine Respiratory Complex, the cattle industry suffers more than $3,000,000,000/year in losses. BHV-1 typically initiates infection in mucosal epithelial surfaces located in the eyes, nose, mouth, upper respiratory tract, or genital tract. Extensive viral gene expression occurs, virus is shed, and clinical symptoms are apparent. Virus then enters the peripheral nervous system, where it establishes a latent infection in sensory neurons. Viral DNA can persist in a latent state for the lifetime of the infected host or it can periodically reactivate. In contrast to the 70-80 viral genes expressed in epithelial cells, only one small region of the viral genome is transcriptionally active in latently infected neurons. This region is designated the latency related (LR) gene. Expression of LR gene products is necessary for the latency-reactivation cycle. The focus of these studies is to understand the mechanism by which the LR gene regulates the latency-reactivation cycle. We have recently found that a protein encoded by the LR gene interacts with cellular proteins that induce apoptosis and regulate transcription. Studies are also being performed to understand how a viral transcriptional activator, bICP0, regulates productive infection, and inhibits innate immune responses. We have also identified a novel protein, ORF-E, which is expressed in latently infected neurons. Finally, these studies may lead to novel strategies that may lead to better vaccines against BHV-1.

IMPACT STATEMENT

Bovine respiratory disease is a significant problem to the cattle industry. BHV-1 is an important pathogen of cattle that initiates Bovine respiratory disease. Studies focused on understanding the replication of BHV-1, and developing better vaccines are crucial for the cattle industry.

NEB 14-123

Develop Pre-Harvest Version of the USDA-FSIS Fast Antibiotic Screening Test and Antibiotic Residue Avoidance Education (DD Griffin)

The first objectives, to develop a live animal test equivalent to FAST by determining the minimum inhibitory concentration (MIC) of commonly used antimicrobials on *Bacillus megaterium* has been accomplished, validation of these results, testing of antibiotic spiked urine

and *in vivo* testing of 12 classes of antibiotics in cattle born in the spring of 2003 and 2004, and whose health histories were traced from birth to the farm of origin has been completed. Using cattle that can be traced from birth insures a complete analysis of health treatment records. Cattle with a history of antibiotic treatment were excluded. Minimum inhibitory concentrations (MIC) for 12 different antibiotics commonly used in the field, using the ATCC reference strain 9885 of *B. megaterium* will be determined and compared to the *in vitro* results. Originally 14 total antibiotics were included, but due to FDA AMDUCA regulations two antibiotics from the class aminoglycosides (gentamicin, neomycin) had to be excluded because of prolonged residue potential. The following antimicrobial groups were represented: aminocyclitols (spectinomycin), beta-lactams (penicillin G, ampicillin, ceftiofur), chloramphenicol derivatives (florfenicol), fluoroquinolones (enrofloxacin), lincosamides (lincomycin), macrolides (tilmicosin, tylosin,), sulfonamides (sulfadimethoxine, sulfamethazine), and tetracyclines (oxytetracycline). A unique renal biopsy technique was developed which use a copotamy approach. A large three millimeter biopsy instrument was developed as the available commercial biopsy instrument did not retrieve a sufficient sample for HPLC analysis. All the sample were collected without apparent discomfort or harm to the cattle used in this project. The renal tissue samples are awaiting analysis. The preliminary outline for the field instruction manual for use of the Pre-Harvest Antibiotic Screening Test has been developed and is being evaluated by 20 practicing beef feedlot veterinarians. These veterinarians are located in six states (Colorado, Iowa, Kansas, Nebraska, Oklahoma and Texas).

IMPACT STATEMENT

Presently there is not a pre-harvest antibiotic residue screening test available to mirror the new antibiotic screening test adopted by the USDA-FSIS 2000. This increases the risk of producers marketing an animal with violative residue, risks consumer confidence in the food supply of our nation and potentially impacts the economic sustainability and profitability of the United States beef industry. A pre-harvest antibiotic screening test that mirrors the USDA-FSIS FAST test will be developed. Disseminate the information to producers and veterinarians.

NEB 14-125
Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety
(RA Moxley, GE Duhamel, DR Smith)

Escherichia coli O157:H7 is an important zoonotic pathogen, and prevention of infection in cattle has been proposed to reduce the risk of human disease. A large-scale study of 140 pens of cattle from 19 commercial feedlots (n=20,556 head) was conducted in which cattle received two doses of vaccine, and the effects of vaccination on terminal rectal colonization and probability for pens to test positive for *E. coli O157:H7* was determined. The pen-testing strategy consisted of culturing seven ropes per pen hung overnight from feedbunk neckrails, a correlate of fecal shedding prevalence. Vaccinated pens of cattle were 27% less likely to test ropes-positive than non-vaccinated pens. Other variables explaining the probability for pens to test ropes-positive were month of the year, region of the state, the number of cattle within the pen, and condition of the pen surface. Terminal rectum mucosal samples from 720 cattle in 21 pens (11 vaccinated, 10 not vaccinated) selected from 140 pens in the study were cultured. Vaccinated cattle were 76% less likely to be colonized in the terminal rectum compared to non-vaccinated cattle. We concluded that, in commercially fed cattle, the two-dose vaccine regimen reduced the probability of *E. coli O157:H7* colonization of the terminal rectum, and reduced pen-level contamination. *Brachyspira pilosicoli* is a major cause of colonic spirochetosis, a polymicrobial inflammatory

bowel disease that affects humans and a wide range of animal species. Five penicillin-binding proteins were identified among human and porcine *B. pilosicoli* strains. Spirochetes that were identified as *B. pilosicoli* were identified in 7.5- to 18-week-old commercial turkeys with cecal spirochetosis and typhlitis. *Enterohepatic Helicobacter* species, including the prototype *H. hepaticus*, are emerging causes of intestinal diseases in humans and animals that produce a novel nuclease toxin, known as cytolethal distending toxin (Cdt). A sensitive fluorometric assay was developed to assess the biochemical properties of the CdtB effector subunit. The Ca2+- and Mg2+-dependence and neutral properties of CdtB were similar to mammalian nucleases, but DNA hydrolysis by CdtB was approximately 100-fold less active and was considerably more resistant to inhibition by ZnCl2 and G-actin than mammalian nucleases. Similar to other gram negative pathogens, the CdtB subunit of *H. hepaticus* localized to the nucleus and alone was sufficient for cellular intoxication. Comparative analysis of CdtB genes and toxins produced by C. *jejuni*, a major cause of food-borne diarrheal illnesses, C. *hyointestinalis*, an emerging cause intestinal diseases in pigs and human beings, and C. *coli* commonly found in intestinal specimens obtained from pigs and other species provided new insights into the pathogenesis of intestinal disease associated with these pathogens and methods for improved detection. By contrast with a recent report suggesting high CdtB activity among C. *coli* isolated from pigs in Denmark, CdtB activity was not found among US porcine C. *coli*.

IMPACT STATEMENT

A large-scale clinical trial in commercial feedlots provided scientific evidence that vaccination with type III secreted proteins is an effective pre-harvest intervention strategy for the control of *E. coli O157:H7* in feedlot cattle. Identification of penicillin-binding proteins of *B. pilosicoli* provides a basis for development of improved control strategies for pathogenic intestinal spirochetes of humans and animals. Cecal spirochetosis caused by *B. pilosicoli* was characterized in commercial turkeys for the first time. Differences between the biochemical properties of Helicobacter CdtB and mammalian nucleases suggest that novel antitoxin control strategies can be developed. A novel Campylobacter cdtB gene encoding a highly toxic CdtB subunit was characterized among porcine and human C. *hyointestinalis*. Porcine C. *coli* are an unlikely source of toxigenic Campylobacter for humans.

NEB 14-126

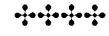
Pathogenesis of Bovine viral Diarrhea Virus and bovine Respiratory Syncytial virus Infections (CL Kelling)

Bovine respiratory disease complex (BRDC) has a major negative impact on profitability in the beef cattle industry. BRDC outbreaks are caused by interactions of multiple ubiquitous pathogens, such as bovine viral diarrhea virus (BVDV) and bovine respiratory syncytial virus in affected animals. Vaccination against BVDV infection should protect against viremia and prevent dissemination of virus throughout the host following exposure, thus blocking infection of target cells of the reproductive and lymphatic systems and preventing fetal infection and immunosuppression, respectively. The objective of this study was to characterize the level of protection against systemic infection and disease from challenge exposure with NY-1 BVDV afforded by use of a modified-live, noncytopathic BVDV type 1 vaccine. Calves, 5-7 months old, were allotted to two groups, group 1, not vaccinated (n = 5), and group 2, vaccinated (n=5). Calves in group 2 were vaccinated subcutaneously on day 0 with BVDV 1 (WRL strain) in a combination vaccine containing other MLV fractions. Calves in both groups were challenged intranasally on day 21 postvaccination

with NY-1 BVDV. Rectal temperatures and clinical signs of disease were recorded daily. Total and differential white blood cell and platelet counts were performed. Histologic examination and immunohistochemical analysis were conducted postmortem to detect lesions and distribution of viral antigens, respectively. Vaccine virus replicated systemically in vaccinated calves as evident antemortem by transient decreased peripheral leukocyte and lymphocyte counts as well as evident postmortem by lymphoid depletion in Peyers patches and mesenteric lymph nodes. Post-challenge, nonvaccinated calves developed elevated body temperatures, respiratory tract disease signs, viremia, leukopenia, lymphopenia and thymic infection. In contrast, post-challenge, vaccinated calves did not exhibit fever nor signs of respiratory tract disease. Post-challenge with NY-1, vaccinated calves were protected against systemic replication of challenge virus since they did not develop reduced leukocyte counts and were protected against viremia and infection of target lymphoid cells.

IMPACT STATEMENT

The BRDC causes a significant negative impact on animal well-being and profitability in the U.S. cattle industry. BVDV infections are important causes of BRDC and vaccines are available to help control those infections; however, the vaccines do not provide complete protection. Our research contributed to the understanding of mechanisms involved in BVDV infections. This understanding is useful for developing effective intervention strategies to help control BRDC to enhance animal well-being and increase profitability.



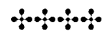
NEB 14-127
Intervention Strategies to Reduce *Escherichia coli* O157:H7 in Beef Feedyards (DR Smith)

The specific aims of this project are: 1) to field test the effect of vaccination and feeding direct-fed microbials for singular, additive or interactive effects on the prevalence of *E. coli O157:H7* in feedlot cattle; and 2) to share our findings with cattle producers, veterinarians, food safety researchers, food safety policy makers, and other stakeholders through extension programming. A phase III clinical trial was conducted to field test the effect of 1) vaccination and 2) feeding a direct-fed microbial product on the prevalence of *E. coli O157:H7* in commercial feedlot cattle. Feedlots were classified as either feeding or not feeding BovamineTM (Lactobacillus acidophilus and Propionibacterium freudenreichii) and pens of vaccinated and nonvaccinated cattle within feedlots were matched by time in a split plot design with the whole plot factor being Bovamine TM and the split plot factor being vaccination. Vaccine was given to cattle at initial processing and again at reimplanting. Each pen of cattle enrolled in the study was sampled for *E. coli O157:H7* starting at least one week after the second dose of vaccine was given, and continued every three weeks for four test period samplings. Pens were sampled for O157 by hanging seven ROPES from the neckrail of the feedbunks where cattle could easily lick, chew, or rub on them. *E. coli O157:H7* was isolated and identified by standard methods involving selective enrichment, immunomagnetic separation, agar plating, biochemical and immunological testing and PCR confirmation. The outcome was whether or not pens tested positive for *E. coli O157:H7* using the ROPES device. Recovery of *E. coli O157:H7* from at least one ROPES classified the pen as positive. The probability for pens of cattle to test ROPES-positive was modeled in a generalized estimation equations (GEE) model using the logit link function and accounting for clustering by matched pairs of pens within feedlot and repeated measures. We studied 140 pens of cattle (n=20,556 head) in 19 feedlots. Vaccinated pens of cattle were less likely to test ROPES-positive (OR=0.59, P=0.004). Other

variables in the model were month of the year, region of the state, the number of cattle per pen, and pen surface condition. At harvest, terminal rectum mucosal cells (TRM) were collected from a sample of cattle from a proportion of vaccinated and unvaccinated pens to assess for colonization. The TRM were collected by scraping the mucosa of the terminal rectum 3-5 cm proximal to the rectoanal juncture. The probability to detect *E. coli O157:H7* from TRM was modeled using a generalized linear mixed model (GLMM) with a logit link function and accounting for random effect of pen. Seven hundred & twenty cattle were tested from within 21 pens of cattle (11 vaccinated, 10 not vaccinated). We observed a 75% lower probability for *E. coli O157:H7* colonization at harvest among vaccinated cattle (OR=0.20; P=0.03). We concluded that the two-dose vaccine regimen reduced the probability of *E. coli O157:H7* colonization of the terminal rectum in commercially fed cattle at harvest.

IMPACT STATEMENT

These data suggest that vaccination reduced *E. coli O157:H7* colonization of cattle and lowered the environmental burden of exposure. Therefore, this strategy may be promising for pre-harvest control of *E. coli O157:H7* in commercially fed cattle. Extension programming will help veterinarians and cattle feeders become aware of how they can apply effective interventions to improve the safety of food.



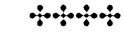
NEB 14-128

Regulation of the Latency-Reactivation Cycle by the Bovine Herpesivrus 1 (BHV-1) Latency Related (LR) Gene (CJ Jones and AR Doster)

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the α-herpesvirus subfamily. Like other members of this subfamily, a latent infection is established in sensory neurons following acute infection. However, the virus can reactivate and spread to other cattle. Reactivation from latency is the mechanism by which the virus survives in nature, and is thus, an important property of pathogenesis. During a latent infection, one abundant viral transcript can be detected, the latency related RNA (LR-RNA). Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1), neuronal like cells (neuro-2A), and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis. We have developed a LR mutant does not express the LR protein encoded by ORF-2. This mutant grows well in tissue culture, but does not grow well in the eyes or tonsil during acute infection of calves. Furthermore, the LR gene mutant does not reactivate from latency indicating that the LR gene is important for the latency-reactivation cycle in calves. Immune infiltration into trigeminal ganglia (TG) occurs as a result of infection and it is believed this is important for regulating latency. Calves infected with the LR mutant contain enhanced immune infiltration and programmed cell death (apoptosis) in TG at the end of acute infection. In addition, the LR gene regulates interferon RNA expression in productively infected calves and cultured bovine cells suggesting this is the mechanism by which the LR gene regulates lymphocyte infiltration into TG.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars per year in the US. The ability of BHV-1 to infect lymphocytes is believed to enhance pathogenesis and virus transmission. We are trying to understand virus host interactions in the peripheral nervous system to facilitate production of a better vaccine.



NEB 14-129

Molecular Analysis of a Mycobacterium Paratuberculosis Colony-Morphology Attenated Mutant (RG Barletta and CJ Czuprynski)

Mycobacterium avium subsp. paratuberculosis (MAP) is the etiological agent of a severe gastroenteritis in ruminants, known as Johnes disease. In the United States alone, economic losses for the dairy industry are estimated to be over $1.0 billion per year. Survival within macrophages is a hallmark of MAP. Identification of genes responsible for MAP survival in macrophages is important to understand how this bacterium causes disease. This project is focused on the MAP mutant 4H2 that displays a colony morphology alteration and an attenuated phenotype in bovine macrophages. In this reporting period, we compared the phagocytosis of MAP wild type by freshly isolated bovine monocytes and a bovine macrophage cell line. Bovine monocytes exhibited a greater ability to phagocytose MAP (i.e. greater percentage of infected cells, and more bacilli per infected cell), than did a bovine macrophage cell line. Phagocytosis of MAP by monocytes, but not the cell line, was significantly enhanced by the addition of autologous serum. Following ingestion, the number of viable MAP cells in monocytes increased during the first 4 days and then declined between day 4 and day 8 after infection, as determined by a radiometric method. The numbers of MAP remained largely unchanged in the cell line during the same incubation period. The number of microscopically visible acid-fast bacilli increased with time in monocytes, but not in the macrophage cell line. These observations suggest that replication and inhibition of bacilli may both occur in monocytes. The difference in the ability of bovine monocytes and the macrophage cell line to ingest and restrain the intracellular growth of MAP provide valuable model systems for investigating various aspects of how MAP enters and persists within its preferred niche, the mononuclear phagocyte. Similar experiments with mutant 4 H2 are in progress. In addition, Southern blot and PCR analyses are consistent with the inactivation of MAP 1152. However, transposon insertions may have polar effects, and thus, we are carrying complementation tests with all wild type genes in the region immediately downstream to the transposon insertion site including genes MAP1152-1153-1155 and 1156. Transformants will be verified and tested for survival in bovine macrophages.

IMPACT STATEMENT

Paratuberculosis and related mycobacterioses cause an estimated one billion dollars in annual losses to U.S. agriculture alone. Molecular genetic studies of MAP mutants attenuated for survival in bovine macrophages may aid in the development of a live-attenuated vaccine to control Johnes disease.

NEB 14-130

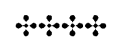
Regulation of the Latency-reactivation Cycle by the Bovine herpesvirus 1 (BHV-1) Latnecy Related (LR) Gene (CJ Jones)

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the α-herpesvirus subfamily. Like other members of this subfamily, a latent infection is established in sensory neurons following acute infection. However, the virus can reactivate and spread to other cattle. Reactivation from latency is the mechanism by which the virus survives in nature, and is thus, an important property of pathogenesis. During a latent infection, one abundant viral transcript can be detected, the latency related RNA (LR-RNA). Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1), neuronal like cells (neuro-2A), and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis. We have developed a LR mutant does not express the LR protein encoded by ORF-2. This mutant grows well in tissue culture, but does not

grow well in the eyes or tonsil during acute infection of calves. Furthermore, the LR gene mutant does not reactivate from latency indicating that the LR gene is important for the latency-reactivation cycle in calves. Immune infiltration into trigeminal ganglia (TG) occurs as a result of infection and it is believed this is important for regulating latency. Calves infected with the LR mutant contain enhanced immune infiltration and programmed cell death (apoptosis) in TG at the end of acute infection. In addition, the LR gene regulates interferon RNA expression in productively infected calves and cultured bovine cells suggesting this is the mechanism by which the LR gene regulates lymphocyte infiltration into TG.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars year in the US. The ability of BHV-1 to infect lymphocytes is believed to enhance pathogenesis and virus transmission. We are trying to understand virus host interactions in the peripheral nervous system to facilitate production of a better vaccine.

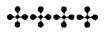


NEB 14-131
Veterinary Field Disease Research Program (DR Smith)

The Field Disease Research Program uses a team approach to solve problems of animal or human health related to livestock production systems. Currently research is underway to 1) estimate the proportion of Nebraska beef cattle herds with Johnes disease and identifying factors associated with Johnes disease status; 2) use microscopic examination of immunohisto-chemistry-stained skin biopsies to detect and remove calves born persistently infected with BVDV from a commercial cow-calf ranch; 3) validate of the use of serology among unvaccinated sentinel beef calves to detect evidence of BVDV exposure during the period when their dams are carrying fetuses susceptible to BVDV infection and subsequent development of the PI state. Seventy-three cow-calf herds representing 20,865 cows were extensively tested for the presence of Johnes disease using a serial testing strategy (ELISA serology followed by fecal culture confirmation of positives). Mean herd size was 286 head, ranging from 94-1,700 cows per herd. A total of 15,402 cows were tested following a pre-determined sampling strategy. Johnes disease was identified in 9 herds (12%). Factors significant as univariate risk factors for Johnes disease positive herds were: 1) the presence of Johnes disease suspect animals in the calving area, or 2) with pre-weaned calves, and 3) exposure of pre-weaned calves to manure contaminated water. Of these variables, the presence of Johnes suspects in the calving area was most explanatory of the herds Johnes disease status. BVDV was eliminated from a 600 head cow-calf ranch by testing calves at birth using microscopic examination of immunohisto-chemistry-stain skin biopsies collected from the ear margin (ear-notch test) to detect calves born BVDV persistently infected (BVDV-PI). Calves ear-notch test- positive in 2003 were removed from the cow herd prior to the breeding season. No calves were born BVDV-PI in 2004 or 2005. Tests in previous years identified the presence of PI calves and BVDV transmission could be traced to breeding pastures where PI calves were present. BVDV serology from 10% of weaned calves from herds with and without BVDV are being evaluated for herd-level diagnostic value. Because of maternal antibodies, titers to BVDV are variable and age-dependent. Data analysis of this years serology results is still underway. Data were analyzed to identify the risk factors for neospora transmission in dairy cattle and the presence of virulence factors among *Moraxella ovis*. Papers were published describing the ecology of *E.coli O157:H7* and *Salmonella* in fed cattle populations.

IMPACT STATEMENT

Neospora, Johnes disease, neonatal diarrhea and BVDV are economically important diseases of cattle. The results of these studies help veterinarians now how to diagnose a herds status for these diseases or to understand how their producer clients may risk exposure and further transmission of the agents of these diseases in their herds. Understanding the ecology of food safety pathogens in cattle environments is important to designing strategies for intervention.

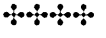


NEB 14-132
Examination of Attenuation and Virulence Determinants of Porcine Reproductive and Respiratory Syndrome Virus
(AK Pattnaik and FA Osorio)

We have generated an infectious molecular clone (PP-18) from the Prime Pac attenuated vaccine strain of PRRSV. The viral genome is 15,520 nucleotides long excluding poly (A) tail, which is the same length as the parental virus. The full-length cDNA clone was assembled in pBR322 after incorporating T7 RNA polymerase promoter. *In vitro* transcribed RNAs, when transfected into MARC-145 cells resulted in production of infectious virus. The rescued virus had the similar growth properties in both MARC-145 cells and porcine alveolar macrophages (PAMs) as the parental vaccine virus. The derivation of this infectious clone from the attenuated PRRSV vaccine strain should significantly facilitate ongoing molecular attenuation studies by providing an avirulent phenotypic background on which to evaluate the contribution that single wt PRRSV genes may have on virulence. We have also generated a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a highly virulent infectious clone (FL-12). Eight viable chimeras, encompassing the entire genome of Prime Pac, have been obtained. Clear-cut characterization of the chimeric viruses for virulence phenotype was obtained *in vivo*, upon inoculation of pregnant sows at day 90 of gestation. Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non-structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions could be ruled out as important determinants of virulence. We further dissected the structural genes for a finer mapping and generated 5 chimeras representing the majority of each individual ORF, 3 through 7. The *in vitro* growth kinetics in both MARC-145 cells and PAM and *in vivo* characterization in pregnant sows are currently in process. This approach should allow us to narrow down the relative contribution of individual ORFs on attenuation of virulence of PRRSV, thus, opening the avenue for precise mapping of the critical regions and residues within the individual gene products that are important for attenuation.

IMPACT STATEMENT

Porcine reproductive and respiratory syndrome (PRRS) in pigs is a complex disease responsible for significant economic losses to the swine industry. The virus, PRRSV in not well characterized and current vaccines are less efficacious. Using a reverse genetic approach, we attempt to understand the genetic determinants of PRRSV that are responsible for causing disease in infected pigs and how such information can be used for generation of safer and efficacious vaccine to combat PRRS.



NEB 14-133

Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach (AK Pattnaik and FA Osorio)

During the past year, we have been able to generate a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a Highly virulent infectious clone (FL-12). Eight viable chimeras, encompassing the entire genome of Prime Pac, have been obtained. Five of the chimeras include all the non-structural open reading frames (ORFs): (1) 5'UTR and NSP1 and part of NSP2, (2) part of NSP2 and part of NSP3, (3) part of NSP3 to NSP8, (4) part of NSP9, and (5) part of NSP9 to NSP12 genes; while the remaining 3 chimeras include all the structural ORFs: (6) part of NSP12, ORF2 and part of ORF3, (7) ORF3 to 7 and 3'UTR, and (8) the entire region spanning all the structural genes and the 3'UTR. Clear-cut characterization of their virulence phenotype was obtained *in vivo*, upon inoculation of pregnant sows at day 90 of gestation. Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non-structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions could be ruled out as important determinants of virulence. We further dissected the structural genes for a finer mapping and generated 5 chimeras representing the majority of each individual ORF, 3 through 7. The *in vitro* growth kinetics in both MARC-145 cells and PAM and *in vivo* characterization in pregnant sows are currently in process. This approach should allow us to narrow down the relative contribution of individual ORFs on attenuation of virulence of PRRSV, thus, opening the avenue for precise mapping of the critical regions and residues within the individual gene products that are important for attenuation. To complement the experiments involving a virulent infectious clone (FL-12), we have also generated an infectious clone (PP-18) from this Prime Pac attenuated vaccine strain. The complete nucleotide sequence was determined and compared with parental vaccine virus. The viral genome is 15,520 nucleotides long excluding poly (A) tail which is the same length as the parental virus. A number of changes in nucleotide sequence were noted. A full-length cDNA clone was assembled in pBR322 after incorporating T7 RNA polymerase promoter. *In vitro* transcribed RNAs, when transfected into MARC-145 cells resulted in production of infectious virus. The rescued virus had the similar growth kinetics in both MARC-145 cells and porcine alveolar macrophages as the parental vaccine virus and could be differentiated from the other American type viruses by indirect fluorescent staining with specific Mabs (SDOW17 and SR30). The derivation of this infectious clone from the attenuated PRRSV vaccine strain should significantly facilitate ongoing molecular attenuation studies by providing an avirulent phenotypic background on which to evaluate the contribution that single wt PRRSV genes may have on virulence.

IMPACT STATEMENT

Porcine reproductive and respiratory syndrome virus (PRRSV) is responsible for significant economic losses to the swine industry. The goal of the project is to gain knowledge about the determinants of virulence and attenuation of PRRSV, which will be important towards developing safer and more efficacious vaccine to combat the disease.

NEB 14-134
Influence of Enterotoxins on Virulence and Colonization of hte Porcine Intestine by *Escherichia coli* (RA Moxley)

Enterotoxigenic *Escherichia coli* (ETEC) is an important cause of diarrhea and death in human beings and animals. This study was conducted as a step toward understanding the biological roles of *E. coli* enterotoxins in intestinal colonization and pathogenesis of disease in piglets. The lambda Red-mediated recombinogenic system has been widely used for gene inactivation in yeasts and different pathogenic bacteria, but to our knowledge, not ETEC. This approach is simpler and more efficient than conventional methods of allelic exchange. In the study herein, this system was used or homologous recombination by two approaches, both plasmid based. In the first approach, amplification of an antibiotic insertion-inactivated enterotoxin gene in a plasmid vector with primers outflanking that gene was done, resulting in a linear PCR product containing the antibiotic gene outflanked on either side by enterotoxin gene nucleotides. In the second approach, enterotoxin genes were disrupted using PCR products from primers specifically targeting antibiotic markers, flanked on either side by short homologies to 5 primer ends of target genes. Conditions were identified that optimize use of the lambda Red system for recombineering in ETEC. Lambda Red and FLP recombinase helper plasmids were used with successful disruption of enterotoxin genes in ETEC. We examined the use of plasmid-derived short (60-bp) and long (>100-bp) PCR-generated homology products, both of which worked well. Recombinants were selected on respective antibiotics, PCR-analyzed and mutagenesis confirmed using Southern blots. The success of lambda Red-mediated recombination in ETEC depended on a number of factors, such as the orientation of the antibiotic marker in the recombination substrates, amount of PCR product, buffers used to make the bacteria electrocompetent, heat shock effects, electroporation conditions and exposure to UV, among others. Overall, we have optimized the lambda Red recombineering technology for use in ETEC, as demonstrated by the precise disruption of the estB and eltAB genes, results which encourage further use of this technology in studies aimed at the elucidation of gene function.

IMPACT STATEMENT

Methods for the inactivation of enterotoxin genes in *Escherichia coli* were optimized, which should facilitate studies aimed at the elucidation of gene function.

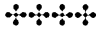
NEB 14-136
Tricarboxylic Acid Cycle Mediated Regulation of Staphylococcus Aureus Virulence Factors (GA Somerville)

Aconitase is a bifunctional protein having both an enzymatic and regulatory function. Inactivation of the aconitase gene in the human and animal pathogen *Staphylococcus aureus* caused a significant reduction in the production of several virulence factors and enhanced long-term survival relative to the wild-type strain. The purpose of this project is to identify those genes that are affected by aconitase inactivation and to determine if those genes are affected by the loss of enzymatic activity or regulatory function. To accomplish this goal, we will employ DNA microarray technology using three tricarboxylic acid cycle mutants. Phase 1 of this project is to construct *S. aureus* strains bearing mutations in either the isocitrate dehydrogenase gene or the citrate synthase gene. During the past year, the plasmids necessary to inactivate these genes were constructed and the screening of putative mutants has begun. We anticipate completion of the mutant construction by early next year. Phase 2 of the project is to analyze the transcriptional profiles of the three tricarboxylic acid cycle mutants (isocitrate dehydrogenase, citrate synthase, and aconitase) using DNA microarray technology in collaboration with the

Department of Pathology and Microbiology at the University of Nebraska Medical Center. We have completed the DNA microarray experiment for the aconitase mutant strain and are awaiting the completion of the additional mutant strains before continuing the microarray experiments. Upon completion of this project, it is anticipated that we will have identified new therapeutic targets to combat S. *aureus* infections.

IMPACT STATEMENT

The bacterium *Staphylococcus aureus* poses Major health risks and causes significant economic hardships in the dairy and food industries. As an example, the economic impact of bovine mastitis to Nebraska per year is approximately $13.4 million. The research contained within this proposal is designed to identify novel therapeutic targets in Staphylococcus aureus, which will facilitate the development of new drugs to combat bovine mastitis.



NEB 14-137
Genetic Basis of Resistance to Food-Borne Bacterial Pathogens (GE Duhamel and JS Weber)

Campylobacter jejuni and *Eschericha coli* are leading causes of food-borne bacterial infections in humans worldwide. Conversely, *Helicobacter hepaticus* is a well-established cause of chronic hepatitis and liver cancer in susceptible mouse strains. Cytolethal distending toxin (CDT) is a newly discovered virulence factor consisting of a tri-peptide complex of subunit A, B and C which is shared among these bacterial pathogens. The proposed mechanism of CDT toxicity is consistent with that of heterodimeric AB2 bacterial toxins where subunits A and C bind to host cell membrane for cellular delivery of the toxic B subunit. The central hypothesis of this project is that subunits A and C of CDT bind to specific host tissue/cellular receptor(s) resulting in damage and illness. The objective of this project is to characterize the distribution of CDT-binding target tissues in susceptible pigs and susceptible and resistant inbred strains of mice. We have cloned, overproduced and characterized the biochemical properties of *H. hepaticus* CdtB in details. Hexahistidine (His6)-tagged CDT subunits A, B, and C of *H. hepaticus* and B subunit of C. *jejuni* have been cloned and purified and monospecific rabbit polyclonal hyperimmune sera have been produced against the B subunits of each pathogen. Currently, His6-tagged A and C subunits of *H. hepaticus* have been cloned and purified for production of rabbit hyperimmune sera whereas overexpression and purification of His6-tagged A and C subunits of C. *jejuni* are in progress.

IMPACT STATEMENT

Identification of cellular targets and receptors for CDT will form the basis for implementation of genetic selection of livestock resistant to these important food-borne bacterial pathogens, and basic understanding of disease susceptibility and resistance to several important bacterial pathogens of humans and animals.

NEB 14-138
Functional Analysis of BICPO, the Major Transcriptional Regulatory Geneof Bovine Herpesvirus 1 (BHV-1) (CJ Jones)

Bovine herpes virus 1 (BHV-1) can cause clinical symptoms in cattle and induce shipping fever, which costs the industry more than $640 million per year. Current vaccines can be pathogenic to small calves, cause abortions, and do not prevent latency of wild-type virus. BHV-1 establishes latency, but can reactivate, in part, because the bICP0 protein activates viral gene expression. bICP0 can activate expression of all three classes of viral genes, is expressed throughout productive infection, and is thus

considered to be the most important viral regulatory gene. We have demonstrated that a C3HC4 zinc ring finger near the amino terminus of bICP0 plays an important role in activating transcription and productive infection. Furthermore, bICP0 interacts with chromatin remodeling enzymes {histone deacytlase 1 (HDAC1) and a histone acetylase (p300)}. Recent studies have demonstrated that bICP0 also inhibits interferon dependent transcription, suggesting that bICP0 regulates innate immune responses. We have recently developed a mutant BHV-1 strain that does not grow efficiently. This mutant grows poorly and does not form well-defined plaques. The mutant virus establishes a persistent infection in cultured bovine cells. In summary, our studies suggest that bICP0 is crucial for productive infection.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars per year in the US. These studies will help us understand bICP0 function and its relationship to disease and may help the vaccine industry design modified live vaccines that induce immunity, do not cause disease in cattle, and do not reactivate from latency.

NEB 14-139

Use of a Green-fluorescent Protein-Expressing Strain of Porcine Reproductive and Resppiratory syndrome Virus of the Study of PRRSV Pathogene (FA Osorio and AK Pattnaik)

Using reverse genetics, we have developed a viable (i.e. infectious) mutant Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) that contains the genetic information to produce green fluorescent protein (GFP). The GFP is a non-viral protein (obtained from jellyfish) that produces fluorescence when exposed to ultraviolet light. This recombinant PRRSV has the ability to infect target cells with the same level of efficiency and virulence as the parental PRRSV, while maintaining a steady level of expression of green fluorescent protein in the virus-infected cells and tissues. Therefore, this powerful imaging tool allows us now to easily and unequivocally track, identify and localize single virus-infected cells and tissues throughout the body of the pig; therefore, positioning us to address some fundamental yet pending issues related to the way PRRSV causes disease *in vivo*. Using this recombinant PRRSV we should be able to follow the sequential progression of the viral load throughout different target sites in the body during all the phases (acute & persistent) of infection, while looking at the complete phenotypic characterization of the infected cell in each case. We would give special emphasis to the possible *in vivo* association of PRRSV with some specialized targets, such as dendritic cells, which are of fundamental importance for the establishment of the protective immune response to pigs against the PRRSV infection. The anticipated results of this project consist of obtaining a better picture of how the PRRSV infection progresses throughout the body and how it affects certain cells that are key for protection against the infection and for elimination of this virus from the body.

IMPACT STATEMENT

Porcine reproductive and respiratory syndrome (PRRS) virus imposes devastating effects on swine health and productivity. In the U.S., PRRS virus causes approximately $560 million in losses each year. By comparison, annual losses in the U.S. to classical swine fever (eradicated from the US in 1978) and pseudorabies virus (eradicated from the U.S. in 2004) were estimated at $364 million and $36 million, respectively prior to their eradication. The National Pork Board and the rest of swine industry are considering to initiate a regional/national eradication campaign. So far there is one country (Chile) that has initiated an official eradication campaign.

NEB 14-140
Stimulating the Development of Veterinarians to Serve Rural America (DD Griffin)

IMPACT STATEMENT

Presently there is not a pre-harvest antibiotic residue screening test available to mirror the new antibiotic screening test adopted by the USDA-FSIS 2000. This increases the risk of producers marketing an animal with violative residue, risks consumer confidence in the nation's food supply and potentially impacts the economic sustainability and profitability of the United States beef industry. A pre-harvest antibiotic screening test that mirrors the USDA-FSIS FAST test will be developed. Disseminate the information to producers and veterinarians.

NEB 14-141
Molecular Genetic Analysis of *Mycobacterium avium* subsp. Parathuberculosis (MAP) and related mycobacterial pathogens (RG Barletta)

Mycobacterium avium subsp. paratuberculosis (MAP) is a slowly growing mycobacterial species, requiring 6 to 8 weeks of culture before colonies can be counted visually. We have made significant progress in the study of replication and survival of MAP strains by developing a luciferase assay to evaluate the replication of MAP more easily. Along with our collaborators at the Pasteur Institut de Brussels (Kris Huygen et al.), we developed a MAP luminescent strain expressing luxAB (luciferase) genes of Vibrio harveyi. We showed the use of this strain for vaccine testing in an experimental mouse model, replacing fastidious colony forming unit counting by rapid luminometry. In addition, we characterized several genes (MAP0282c, MAP2296c, MAP2297c, MAP1150c, MAP1151c and MAP0460) whose inactivation by a transposon insertion (within the promoter region or the structional gene) led to a reduced survival in bovine macrophages. We have also made significant progress in the identification of drug targets. We have collaborated with Corporacion para Investigaciones Biologicas (CIB, Medellin, Colombia)and the Texas A&M University (College Station) to analyze the Mycobacterium tuberculosis D-alanine-D-alanine ligase (Ddl). This enzyme catalyzes the formation of the basic peptidoglycan moiety D-alanyl-D-alanine. Saturation mutagenesis suggests that ddl is an essential gene and likely encodes a lethal drug target. To obtain large amounts of enzyme for structural and functional studies, we over-produced the *M. tuberculosis* Ddl enzyme in recombinant *Escherichia coli*. The *M. tuberculosis* Ddl represented 5-10% of the total protein as determined by SDS gel electrophoresis. The purified soluble recombinant protein displayed enzymatic activity for the ATP-dependent catalysis of D-alanyl-D-alanine formation from D-alanine. The enzyme activity is dependent on ATP and Mg++ cations, and optimal activity requires K+ cations. D-cycloserine (DCS) inhibited enzyme activity in a concentration-dependent manner. The significance of this work resides in the development of novel inhibitors of peptidoglycan biosynthesis as candidate antimycobacterial agents.

IMPACT STATEMENT

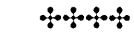
Paratuberculosis and related mycobacterioses cause an estimated one billion dollars in annual losses to U.S. agriculture alone. The functional analysis of mutant strains may aid in the development of a vaccine to control Johne's disease and bovine tuberculosis.

NEB 39-142
Development of Broad-Spectrium Antibiotics Against Bacterial pathogens (RG Barletta, R Powers and JM Takacs)

We have obtained large amounts of one of the enzymes in the murein (Mur) biosynthetic pathway. We have developed a high throughput assay and are synthesizing chemical inhibitors. We also developed a NMR metabolic profiling method to analyze the essential role of D-alanine racemase in the Mur pathway. We have prepared cell extracts of wild-type, susceptible and resistant *Mycobacterium smegmatis* strains, a model system for Mycobacterium tuberculosis, to conduct NMR profiling studies. The drug used for this study was the murein (peptidoglycan) synthesis inhibitor D-cycloserine (DCS). We analyzed the NMR data by the principal component analysis (PCA) methodology, a well established statistical technique that determines the direction of largest variations in the NMR data set. The results showed three distinct clusterings, indicating that the drug tested is active toward the system. The DCS susceptible strain TAM23 treated with and without DCS clustered in different locations, indicating that DCS is targeting a different protein in the system, which is a discovery of significance in the field. Since TAM23 is deficient in D-alanine racemase activity, this result indicates that this enzyme is not the lethal target of DCS. The wild-type (mcc155) and resistant GPM267 strains treated with DCS clustered with TAM23 treated with DCS indicating that DCS inhibits the same secondary protein present in TAM23. These results are consistent with one lethal target for DCS different from D-alanine racemase.

IMPACT STATEMENT

Antimicrobial agents (antibiotics) continue to play an essential role in the fight against infectious diseases of human and veterinary importance. The widespread use of antibiotics has resulted in the emergence of drug resistance. Nonetheless, antibiotics still provide an essential means to accomplish these rapid intervention strategies. The expected outcome of this research effort will be the identification of candidate broad-spectrum antimicrobial agents that minimize the emergence of drug resistance.



NEB 39-143
Functional Analysis of Proteins Encoded by the Bovine herpesvirus 1 (BHV-1) (CJ Jones)

Bovine herpes virus 1 (BHV-1) causes a variety of upper respiratory tract disorders in cattle, and induces shipping fever (Bovine Respiratory Disorder). BHV-1 infections and Bovine Respiratory Disorder cost the US cattle industry more than $500 million per year. Current modified live vaccines directed against BHV-1 can be pathogenic to small calves and cause abortions in pregnant cows. BHV-1, including current modified live vaccines, establishes latency in sensory neurons and periodically reactivates from latency. Thus, the latency-reactivation cycle is crucial for virus transmission and pathogenesis. The latency related (LR) RNA is abundantly expressed in sensory neurons of latently infected cattle. A LR mutant BHV-1 strain that contains stop codons near the 5'-terminus of the LR-RNA does not reactivate from latency. Calves acutely infected with the LR mutant have reduced shedding of infectious virus from the eye, tonsil, and trigeminal ganglia. The LR mutant virus does not express two proteins (ORF-2 and RF-C) strongly suggesting that expression of these proteins is necessary for the latency-reactivation cycle. ORF-2 and/or RF-C expression are necessary for inhibiting apoptosis and beta interferon (IFN-b) RNA expression. A novel LR fusion protein binds to cellular proteins that regulate transcription and apoptosis. These interactions are believed to be necessary for regulating the latency-reactivation cycle in sensory neurons. Future studies are designed to help us understand how proteins encoded by the

LR gene regulate the latency-reactivation cycle, and innate immune responses.

IMPACT STATEMENT

Completion of these studies may lead to a superior modified live vaccine that induces higher levels of innate immunity, does not cause clinical disease in cattle, and does not reactivate from latency.

Department of Veterinary and Biomedical Sciences
2006 International Activities

Raúl G. Barletta

Dr. Barletta has a specific project, which includes the Mycobacterial drug targets. Corporacion para Investigaciones Biologicas, CIB, Medellin, Colombia. Dr. Barletta will serve as the PI, representing the University of Nebraska-Lincoln and will work in collaboration with J. Robledo, CIB and Ofelia Chacon also from the University of Nebraska-Lincoln, CIB. This special project will be funded by an NIH and USDA grants, subcontracts and Colciencias, Colombian Federal Agency for Science.

Marjorie F. Lou

Dr. Lou continues to serve as the Founder and organizer of the Asian Cataract Research Conference. She continues to organize the Biannual Conference that will be held in a major city in Asia. The 6th Conference will be held in Beijing, China, June 3-7, 2006, which Dr. Lou has been actively supervising the progress of the local organizers. For the same reason, she is actively promoting and sponsoring lens and cataract research programs in Asian countries, such as South Korea, Hong Kong, China, India, Pakistan and Singapore.

Dr. Lou was elected as Membership Committee Chairman for the International Society for Eye Research (ISER), 2004-2007. As a Committee Chairman, she is responsible in promoting and increasing new or active members. She also is responsible for the Biannual International Congress of Eye Research (ICER), sponsored by ISER for the selection of young investigator's travel award and this year there are 25 that were selected.

Dr. Lou continues to be Board of Trustees for the National Foundation for Eye Research since 1998. This research foundation sponsors US-Japan Cataract Corporation Research Group (CCRG) Conference. Each board member is responsible for selecting one young investigator Lens Research Achievement Award per year and other travel grants to attend the US-Japan CCRG meetings.

Fernando A. Osorio

Dr. Osorio continues to serve as an Advisor for the PRRSV Eradication Campaign in Chile. Fernando continues on a joint international effort to fight PRRS. His collaborative work with J-H Sur (Konkuk U., Seoul. Korea) and M. Quezada (University of Concepcion, Chillan, Chile) jointly develop new practical techniques to fight PRRS in each of the three countries. The Porcine Reproductive and Respiratory Syndrome (PRRS) is a disease that causes multi-billion dollar losses worldwide.

Dr. Osorio is a Member of the Scientific Advisory Committee "Center for Research in Swine Infectious Diseases." He will serve in the capacity of Visiting Faculty of Veterinary Medicine, St-Hyacinthe, University of Montreal, Québec, Canada, beginning 2006

Asit K. Pattnaik

Dr. Pattnaik will be attending the International Conference on "Negative-Strand RNA Viruses," to be held in Salamanca, Spain, June 2006. Dr. Pattnaik will be a speaker at the symposium to an audience of 1,200 colleagues.

Dr. Pattnaik will also be attending and giving a lecture at the Asia Pacific Congress on "Medical Virology," in New Delhi, India, November, 2006.

Department of Veterinary and Biomedical Sciences
2006 Veterinary Extension Program

Topics/Titles of Extension Program Emphases

✦Dicky Dee Griffin

Pre-Harvest Food Safety

My continued focus on the education of production management influences, both Extension Educators and Veterinarians, on techniques that will build good production management practices into beef production. Special effort is made with Beef Quality Assurance (BQA) and antibiotic residue avoidance. The program also focuses on the financial assessment of production management changes.

Biosecurity and Security in Beef Production Systems

I will be continuing my focus on the education of biosecurity and security principles applied appropriately to fit the needs of the beef production unit. The Hazard Analysis Critical Control Points (HACCP) system is used as the technique evaluation and design of the appropriate biosecurity and security system for each operation.

✦David R. Smith

Extension Emphasis

I will continue with communicating the principles of biosecurity and pathogen containment; emphasizing diagnostics and the role of production-systems on transmission of pathogens and the resulting impact on dairy and beef cattle health and pre-harvest food safety.
Internet: <http://vetext.unl.edu>

2006 Extension Programming

Biocontainment of calf scours -the Sandhills Calving System
Biosecurity and diagnosis of Johne's disease and BVDV in cattle herds
Bioterrorism preparedness
Use of antibiotics in animal agriculture
Nebraska 4H Veterinary Science School Standards curriculum
Nebraska State Fair birthing pavilion
Nebraska State Fair livestock drug testing
Co-advisor to the NU Pre-veterinary Club
Field investigations: beef calf scours, Salmonellosis in a dairy, cow-calf respiratory disease, feeder cattle receiving vaccination programs, beef abortion cluster, hydrocele in bulls

Department of Veterinary and Biomedical Sciences
Extension Faculty Programs

♦D. Dee Griffin, DVM, MS, Feedlot Veterinarian

Beef Safety from "Mad Cow" Disease

What is "Mad Cow" Disease?

Bovine Spongiform Encephalopathy (BSE), or commonly called **"mad cow"** disease, is a degenerative neurological disease in cattle that is caused by misfolded proteins (called prions) that build up in the central nervous system (CNS) and eventually kill nerve cells. BSE is spread through certain cattle feed ingredients, which have been banned since 1997.

Beef Safety from BSE

The world's leading scientists, medical professionals and government officials agree that BSE is not a public or animal health risk in the United States.

Interlocking Safeguards

For nearly 20 years, the US Department of Agriculture (USDA) has been developing and implementing a series of interlocking safeguards to ensure a safe, BSE-free food supply. Tissues that could potentially carry BSE in an animal – including the brain and spinal cord – must be removed from cattle prior to processing, and therefore, are not allowed into the food supply. This step along with other safeguards ensures BSE has no affect on public health.

Enhanced BSE Surveillance

In June 2004, USDA instituted a one-time expanded testing program to determine the incidence of BSE in the United States. From June 1, 2004 through August 20, 2006, USDA tested 787,711 cattle and found just two BSE positives. A scientific analysis of seven years of surveillance data found the estimated prevalence of BSE in the United States to be less than one infected animal per one million adult cattle.

Variant Creutzfeldt-Jakob Disease

BSE is in a class of rare neurological diseases called Transmissible Spongiform Encephalopathy (TSE), some of which affect animals while others affect humans. All TSE are associated with accumulation of prions in CNS tissues. Human TSEs include sporadic Creutzfeldt-Jakob disease (sCJD or CJD), which accounts for about 85% of CJD cases and has an annual incidence of about one case per one million population worldwide.

Another human TSE is the very rare variant Creutzfeldt-Jakob disease (vCJD), which research from the United Kingdom has associated with consumption of products contaminated with CNS tissue from BSE-infected cattle. There have been about 200 cases

of vCJD in the world (most of these in the UK) and zero cases associated with beef consumption in the United States.

Washington, July 12, 2006, The Food Safety and Inspection Service (FSIS) announced a scheduled technical meeting to present and receive comments on the updated risk assessment for Bovine Spongiform Encephalopathy (BSE) in the United States. The technical meeting will be to discuss the updated Harvard Risk Assessment Model. In April 1998, USDA entered into a cooperative agreement with the Harvard Center for Risk Analysis (HCRA) of the Harvard School of Public Health and the Center for Computational Epidemiology at Tuskegee University to conduct a comprehensive investigation of the BSE risk in the United States. Because of updated scientific data about infectious tissues, new information about compliance with the FDA feed controls, new assumptions regarding beef consumption, and structural changes in the model related to the disposition of non-ambulatory cattle, the base case projections differ slightly from those reported in October 2003. The report, referred to as the Harvard Risk Assessment, was completed in 2001, and was revised in 2003 after being peer reviewed. Both USDA and the Department of Health and Human Services' Food and Drug Administration (FDA) implemented measures to strengthen protections against BSE in the United States immediately following the discovery of BSE in a cow in Washington State on December 23, 2003. USDA then contracted with the HCRA in May 2004, to revised the Harvard Risk Assessment model to reflect new information available through December 2003. The updated risk assessment analyzes the effects of various BSE risk mitigation scenarios. HCRA analyzed the effects of the measures implemented by USDA and HHS-FDA and analyzed recommendations made by an international expert BSE panel that was convened to review the actions taken by the United States in response to the BSE case in Washington State.

In 2006, the first focus of my program will be to improve Veterinary Recruitment to Rural Communities - Work with the Academy of Rural Veterinarians to develop mentor ship opportunities for veterinary students with rural veterinary practitioners. Objectives to reach this goal is 1) Aid the organization and funding efforts to strengthen veterinary service in rural communities. My accomplishment was to acquire from the Academy of Rural Veterinarians, with funding from a USDA CSREES grant obtained and it has mentored over 120 veterinary students. The impact from this has provided 20 students with work in the rural communities. Each new veterinarian will infuse over $100,000 into that community yearly.

My second focus in my program is the support of the NC and NCBA quality assurance and cattle efforts - Aid the NC and NCBA with their efforts to educate producers and their employees in proper quality assurance and cattle care. Objectives to reach this goal is 1) Participate in NCBA's quality assurance and animal care efforts and 2) Help develop training for auction market workers that includes livestock care and handling and personal worker safety. My accomplishments was an active participation in both the NCBA's Animal Health Network and the NCBA's Beef Quality Assurance Advisory Board. I also served on the Nebraska Cattlemen's Technical Advisory Board. The impact that this serves is the educational effort that plays a key part of the success we have had in the beef industry in virtually illuminating chemical resides in beef.

My third focus in my program is the Biosecurity training for cattle producers and their employees. Objectives to reach this goal is 1) Develop and deliver educational programs and presentation on biosecurity. My accomplishments was to serve on the Nebraska LEDRS (Livestock

Emergency Disease Response System). Delivered numerous biosecurity presentations in Nebraska, regionally in other states and at a national meeting of the American Association of Bovine Practitioners. The impact was an involvement in livestock biosecurity education and training which helped protect one of Nebraska's most important economic resources.

My fourth focus in my program is to develop and revise my educational materials to fit the needs of the new relationship UNL has with ISU. Objectives to reach my goal is to revise the 260 educational pieces that were developed for KSU to adapt them to address curriculum differences at ISU. The impact will be well-served to those students who will attend Iowa State University.

◆*David R. Smith, DVM, PhD, Dairy and Beef Cattle Veterinarian*

Johne's Disease

What is Johne's Disease?

Johne's (pronounced "Yo-nees") Disease is a contagious bacterial disease of the intestinal tract. A german veterinarian first described the disease in a dairy cow in 1895; his name is used as the common name for the disease. The disease is also called paratuberculosis.

What kind of animals get Johne's Disease?

Johne's disease occurs in a wide variety of animals, but most often in ruminants. Ruminants are hoofed mammal that chew their cud and have a 3-4 chambered stomach. Some of the more common ruminates are: cattle, sheep, goats, deer, antelope and bison. Johne's disease has been reported in all of these animals, but is most commonly seen in dairy cattle.

What causes Johne's Disease?

The bacterium that causes Johne's disease is named *Mycobacerium paratuberculosis* often the name is abbreviated *M. paratuberculosis. M. paratuberculosis* is a relative of the bacterium that causes tuberculosis in humans (*Mycobacterium tuberculosis*), cattle (*Mycobacterium bovis)* and birds (*Mycobacterium avium)* - Some taxonomists favor the name *Mycobacterium avium* subspecies paratuberculosis for the organism that causes Johne's disease, since genetically it is closely related to *M. avium. M. paratuberculosis* can replicate only when it is in animals: it cannot multiply in nature, outside the animal. However, if soil or water is contaminated with this bacterium, it can survive there for over a year, because of its resistance to heat, cold and drying.

What are the signs of Johne's Disease?

Primarly, there are only two signs of *M. paratuberculosis* infection: diarrhea and rapid weight loss. In some animals, like sheep and goats, diarrhea is less common. In general, animals with Johne's disease "waste away" despite their continuing to eat well. Infected animals maintain a normal temperature, but may appear unthrifty and can become weak in later stages of the infection. Because of the slowly progressive nature of the infection, signs of Johne's disease are usually not seen until animals are adults. Since the signs of Johne's disease can be confused with the signs of several diseases, a diagnosis can be confirmed only

by use of laboratory tests.

How common is Johne's Disease?

Johne's disease occurs worldwide. In the US, it is estimated that 7.8% of the beef herds and 22% of the dairy herds are infected with *M. paratuberculosis.* Infection rates in cattle in other countries are generally similar. The disease has been reported in sheep, goats, elk, deer, bison, llamas and wild ruminants in zoos, but accurate estimates of the number of infected animals are not available.

How do animals get Johne's disease?

Johne's disease typically enters a herd or flock of animals when an infected, but healthy-looking, animal is purchased. The infection then spreads to other animals, often without the owner's being aware of it. Eventually, perhaps after several years, the owner recognizes signs of the disease in a number of animals. Individual animals get infected by close contact with other infected animals, that shed the bacterium in their manure. Most often, the infection is acquired by eating materials contaminated with *M. paratuberculosis* when animals are very young. Young animals are far more susceptible to infection than are adults. Ingestion of the bacterium occurs when the newborn's environment is contaminated with manure from an infected adult animal, or by drinking milk from an infected animal. The milk may become contaminated from the environment (manure-stained teats) or, in the advanced stages of the infection, the bacterium is shed directly into the milk. This has been shown to occur in dairy cattle and is presumed to occur in other species as well. After infection, many months or years go by until the infected animals show signs of Johne's disease.

How can you prevent your animals from getting Johne's Disease?

The best way to avoid this chronic infectious disease is to be as certain as possible that animals brought into the herd are not infected with *M. paratuberculosis.* This is not always easy. Laboratory tests for cattle are more widely available than for sheep, goats or zoo animals. Still, some type of test is available for every animal. When using laboratory tests for pre-purchase screening of animals, it is important to understand that tests done on individual animals are not 100% sensitive, meaning they cannot detect 100% of the infected animals. A way to get around this problem is to rely on tests done on the source herd of animals from which you want to purchase. If a whole herd test is 100% negative, then the probability the herd is free of *M. paratuberculosis* infection is very high. Johne's disease test-negative herds are the best sources of animals for purchase.

How do you control Johne's Disease?

Methods for Johne's disease control depend on the type of animal and the patterns of husbandry. In principle, two stategies must be employed at the same time:

a) Newborn animals must be protected from infection by being born and raised in a clean environment and fed milk-free of *M. paratuberculosis.*

b) Adult animals carrying the *M. paratuberculosis* infection must be identified by laboratory tests and removed from the herd, flock or enclosure.

Can humans get Johne's Disease?

This is a very controversial subject. There is a human disease called Crohn's Disease that resembles Johne's Disease. Crohn's Disease most commonly affects people 15-35 years old. It is a chronic diarrheal disease that has no known cause and no known cure. Recent reports in the medical literature indicate that 30-75% of patients with Crohn's Disease test positive for *M. paratuberculosis*. A few laboratories have grown *M. paratuberculosis* from a few Crohn's patients specimens. However, no connection has been shown between contact with animals with Johne's disease or milk consumption and Crohn's disease.

In 2006, the first focus of my program will involve in applying existing knowledge related to veterinary population medicine in educational programs and problem-solving efforts directed toward the dairy and beef industries, veterinarians, and public health issues associated with those areas. The objectives to reach these goals are 1) Plan, develop and conduct educational programs for veterinarians and producers relating to the development of the dairy and beef cattle industries in Nebraska and the Unted States, on topics such as animal health, herd health management, animal well-being and pre-harvest food safety; 2) Maintain a close relationship with regulatory officials of the state and federal governments on animal health and public health programs especially as the latter relate to zonotic and food-borne diseases; 3) Provide public service information for Nebraska citizens, including urbanites and suburbanites on zoonotic and food-borne disease topics related to the dairy and beef cattle industries; 4) Cooperate with the department and Nebraska Veterinary Medical Association in planning continuing education programs for Nebraska veterinarians.

My second focus in my program will be to contribute new knowledge in the field of population medicine (epidemiology) as they relate to the dairy and beef industries, veterinary medicine, and associated public health issues. Objectives to accomplish this will be to participate in on-farm cattle production research related to pathogen transmission; 2) Author or co-author scholarly publictions on topics related to dairy or beef cattle population medicine and/or pre-harvest food safety.

My third focus in my program will be to contribute other scholarly efforts to my department and the university as the need arises. Objectives will be to mentor students in graduate studies and/or professional growth; 2) Provide lectures or laboratories for undergraduate, or graduates as needed and 3) contribute to committees, professional organization and/or other services.

Department Of Veterinary and Biomedical Sciences
Nebraska Veterinary Diagnostic Center

David J. Steffen, Professor and Director
BS, DVM, PhD, ABVP

OVERVIEW The NVDC consists of the diagnostic laboratory in Lincoln. The VDC is an AAVLD provisionally accredited full service diagnostic laboratory, whose emphasis is on food animal diagnostic services and disease surveillance with as a second area of emphasis in surgical pathology. The lab maintians basic services to the poultry industry, wildlife, zoo, pet and public health interests. The laboratory also strives to meet research needs of campus and private concerns in the state with laboratory support primarily in pathology, histology and microbiology research services. The Nebraska Veterinary Diagnostic Laboratory provides a full complement of necropsy, bacteriologic, histologic, immunohistochemical, molecular diagnostic, serologic, toxicologic, electronmicroscopic and traditional virologic services.

VISION The vision of the Nebraska Veterinary Diagnostic Center is to enhance the economic vitality and life quality for all Nebraskans by promoting healthy livestock and companion animals, enhancing the safety of animal-derived consumer products and protecting wildlife resources through disease control and enhancing and understanding of diseases.

MISSION The Diagnostic Laboratory's mission is to assist veterinarians, their clients, and others responsible for animal and public health in the detection, prevention and understanding of animal diseases. Faculty and staff approach these tasks by providing accessible, accountable, timely and accurate diagnostic services and by sharing information generated through scholarly publications, meeting presentations, including direct communications.

OBJECTIVES Provide accessible, accountable, timely and accurate diagnostic, research and information services to veterinarians, animal owners, food producers and animal health industries.

Provide proactive investigational support to enhance population approaches to, and efficiency of diagnostic testing.

Implement modern current and updated biotechnology methods, where appropriate, into diagnostic services.

Monitor and report the incidence and threat of animal diseases, as well as diseases that are transmissible from animals to humans.

Share new information with colleagues through publication in a manner that respects the confidentiality of all clientele.

Prioritize research activities, in applied areas, (epidemiology, diagnostic techniques and emerging diseases) and areas of current concern to Nebraska citizens.

Improve communications and cooperation with extension, teaching and research programs throughout IANR.

Maintain an affordable diagnostic testing program to assure sufficient case numbers in the support of disease surveillance functions with the support of international trade and have full access (tissues, field isolates, etc.) to current research information and materials for accurate diagnostic testing and disease prevalance and trends.

Improve communications with target clientele toward fulfilling their needs and providing services based on those needs.

Communicate with clientele toward educating them on population approaches to diagnostics and current updated testing technologies.

Assist in anyway with the National Surveillance Programs.

Support advances in current and updated biomedical research through diagnostic services to reach a wider range of clientele in the community.

Director's Message --

In 2006, we have had to adapted to the loss of faculty positions, although the cuts leave us lacking in some areas. We were fortunate that fee revenues have allowed us to address the faculty shortage by hiring, a six-month appointment, an experienced pahologist the last three springs. Dr. John Schmitz also assisted with pathology cases prior to his departure in August. The new Cooperative Veterinary Education Program created opportunities to increase pathology faculty. The teaching position currently advertised carries a 0.25 FTE diagnostic pathology appointment. Current diagnostic faculty will contribute to teaching in the program so the net effect on available time for service and scholarship will need to be evaluated during implementation of the additional teaching loads.

We no longer have expertise in clinical toxicology, poultry medicine or a swine specialist. The new teaching program includes a parasitology position to be hired into the Entomology Department, which may restore access to parasitology expertise locally. Dr. Brodersen has assumed leadership of swine extension programming for our department. The toxicology program is being led by Dr. Michael Carlson, an Analytical Chemist. Dr. Carlson is heavily involved in undergraduate recruiting and teaching activities and he will be teaching pharmacology to veterinary students, which diminishes his time commitment he has invested in diagnostics. It is felt that for the toxicology unit to be viable, we must have a research component to justify the infrastructure investment. Program of excellence funds have been requested to hire a Veterinary Toxicologist to restore that area of expertise and a research role into the laboratory and to enhance the professional school teaching programs. In the interim, the diagnostic laboratory has developed collaborations with the Water Center for access to better analytical chemistry equipment (newer ICP and GC/MASS Spectroscopy capability) and to access additional analytical expertise. We currently support 0.5 staff FTE in that unit to facilitate the cooperative analytical chemistry efforts. We are exploring jointly addressing clinical and referral toxicology needs with ISU as an alternative, if the program of excellence funding is not received. The loss of avian expertise has not effectively been addressed. The possibility exists that the pathology hire could be an individual with some interest or expertise in that area. The lab is also heavily dependent on fee revenues to support faculty and staffing needs and fees are heavily dependent on BVDV testing and State and Federal contract testing programs. The narrow funding base carries some risk, but has been a tradition for the laboratory (former base PRV testing); we are constantly aware of the risk and always seek new opportunities. At this time, it appears that we have adquate staffing levels as revenues remains stable.

In June 2004, a pathology resident position was implemented and this position now provides significant assistance with diagnostic cases. Expansion of the program to add additional residents in pathology or in clinical microbiology is in the stages of final development. This will complement our multifaceted mission in service and education and help address the national shortages of trained clincial diagnostic specialists, and hopefully, enhance scholarly opportunities for faculty. The program is again dependent on lab fee revenues. Opportunities to offset this may exist with teaching assistantships in the new educational program.

Biosafety approval for diagnostic operations has been requested from the campus Environmental Health and Safety Office and is in review. Increased singage is present in the

laboratory to distinguish the clean (mail, break and reception areas) from lab areas and from the hallway "transition" areas. Coat hooks have been installed for hanging lab coats at the transition area and lockers have been added to keep personal items for staff out of lab work areas. The use of consultation coats in offices has been discontinued as the clean white coats could not be distinguished from lab coats. Safe operating policies have been approved in several areas and specific safety precautions are part of each Safety Operating Procedure (SOP). Training of staff on safety has been standardized and prioritized to complement the facilities enhancements. General safety training and biosafety training occur in the first two days of employment and are coordinated locally using web courses available through Environmental Health and Safety (EHS). Employees at risk of rabies (those in necropsy and those handling fresh tissues) are apprised of the risks and offered vaccination. Vaccination is required of necropsy workers. A necropsy work area operating SOP was developed to address the concerns created as the necropsy suite must also serve as the mail room for opening diagnostic packages. While we agree it is desirable to have separate mail and necropsy facilities, the lab space is inadequate to allow for that. While not ideal, we feel that strict adherence to the SOP does effectively minimize risk and addressed immediate biocontainment and safety conerns.

Our quality manual has undergone a complete revision and is in an active voice with specificity in areas where specificity was lacking. SOPs are in place and approved for all priority assays and in functional draft form for the remaining assays. A few will require moderate reformatting before final approval. A few policy guidelines and systemwide procedures that do not affect test results remain in the developmental stages.

A second server was added to increase security of the LIMS system from outside attack and installation of a new LIMS system (VADDS) is in progress. Additional information on the LIMS system and what we hope to achieve is listed below.

Conversion to a new LIMS system is in BETA testing and will impact the way in which we communicate with clients. Much will stay the same, but individual test results once verified by the case coordinator will become immediately available over the web rather than waiting until the final report is approved by the coordinator. Once cases are accessioned, submitters will be able to view test requests. Due to limited internet use in some rural areas, written or faxed reports will still be a primary mechanism for issuing final reports for the immediate future. It is anticipated that the internal paper reports to flag results as available will be eliminated as the new IT system should handle that, and all archiving will then become digital with the exception of lab worksheets and pathologist notes that will remain archieved for a minimum of five years.

To increase communications, the laboratory has published several issues of a newsletter. Specific mailings are used for new assays and programs and some changes needing urgent communication are amended to or sent with reports. The website still exists, but is in need of attention. A University-wide template has been created and the webs sorely needs to be reformatted to the standard. Staffing limitations delay addressing the website upgrades and proactive community outreach as a priority. This is unfortunate as marketing is mission critical. Faculty and lab managers regularly attend state NVMA Conventions and there is a University Liaison Committee that provides for feedback on the laboratory and other university issues to the director and department head. A few faculty serve on the NVMA Committees and faculty provide scientific presentations

when invited. We always have a recognizable presence at the state meetings. Getting representation to regional meetings has not been possible.

With the opportunities created by the Cooperative Veterinry Education Program, and the appointment of the new department head, the laboratory recently initiated revision of the strategic plan to address the universities changing needs and opportunities.

In 2006, the purchase of capital equipment for the diagnostic laboratories includes two major Microscopes with accessories from North Central Instruments; for the Virology laboratory, a Smartcycler II with add-on block from Fisher Scientific Co., LLC; Kingfisher 96 and Kingfisher Mag Processor, both with various accessories from VWR International and a 7500 PCR Computer System with various accessories for the Histology laboratory a Shandon Finess Microtome with accessories from Histotronix, Inc. and a Biomic V3 Microbiology System from Giles Scientific, Inc. for the Microbiology laboratory. The purchase of this critical equipment for the Veterianry Diagnostic Center is considered an asset for faculty, staff and technicians to conduct diagnostic services more efficiently.

Areas of Weakness: We have inadequate state funding for staff and faculty to allow coverage of the broad range of damands. The heavy reliance on revolving funds for 1.5 FTE of essential faculty raises concerns regarding sustainability, and it must be reconciled with diversion of facutly FTE into undergraduate advising and professional school teaching contributions due to past cuts and where inadequate teaching budgets do not supports these positions. The labs remain weak in poultry pathology, where absence of clinical veterinary expertise in the state leaves the industry unsuppoprted. The facilities limitations affect the ability to capitalize on new opportunities and address fully safety concerns that often raises.

Areas of Strength: The Diagnostic Center is extremetly greatful and thankful to have the committed faculty and staff that accepts challenges and cares about customer service is considered our biggest strength. The staff seeks to contribute to the multiple goals our mission embraces as an academic service laboratory. We have staff members that are interested and willing to implement new testing protocols. We have many staff personnel that steps up with extra efforts to fulfill contracts and effectively complete case load surges. This dedication is esstential in guaranteed continued soft-money resources. We have excellent modern equipment in most laboratory sections, excepting toxicology, which allows us to capitalize on many opportunities and remian at the forefront of implementing technology. The lab is particularly well-equipped in immunohisto-chemistry and molecular diagnostics. The pathology section is also strongly supported for digital imaging to allow the capture of data for publications, teaching and outreach education in a most efficient manner. We have good slide archives for training residents and excellent on-campus library holdings.

The Diagnostic Center would like to recognize Judi Galeota who received the Outstanding Employee Award for Managerial/Professional Staff in the Institute of Agriculture and Natural Resources for the period of May/June 2006. Congratulations Judi ! I also want to thank all the diagnostic personnel for their dedication and support for a job well done.

Specific activities of the NVDLS are summarized in the following tables.

Table 5. Accessions by Species by Month (January 2006- December 2006)

Nebraska Veterinary Diagnostic Laboratory - Lincoln, Nebraska

Species	Jan.	Febr.	Mar.	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total	% of Total
Avian - Chicken	6	18	21	16	17	16	23	25	19	31	22	42	256	1.63
Avian - Misc.	6	12	24	19	20	71	109	176	95	57	72	52	713	4.54
Avian - Turkey	1	1	2	0	0	0	3	11	2	12	3	6	38	0.24
Bovine	706	767	984	864	809	575	438	524	656	758	683	578	8,342	53.16
Canine	225	219	236	199	225	264	211	258	234	239	222	241	2,773	17.67
Caprine	5	8	14	9	10	7	5	7	3	6	14	7	95	0.61
Equine	32	44	86	115	109	74	76	117	81	69	43	35	881	5.61
Feed & Water	1	3	1	2	4	0	5	3	1	1	0	0	24	0.15
Feline	58	32	64	56	58	63	57	61	53	55	51	50	658	4.20
Ovine	10	4	5	4	3	2	0	2	6	5	2	2	45	0.29
Porcine	74	57	82	115	106	115	102	104	88	95	91	75	1,104	7.03
Porcine - PRV	20	15	19	15	19	18	12	15	10	17	20	7	187	1.19
Misc. Mammal	48	37	38	35	38	44	33	48	34	58	32	30	475	3.03
Misc.	7	13	13	10	11	10	12	8	7	4	4	6	102	0.65
TOTAL	1,199	1,230	1,589	1,459	1,429	1,259	1,086	1,359	1,289	1,407	1,259	1,131	15,693	100.00

Table 6. Summary of Laboratory Procedures (January 2006 - December 2006)

NEBRASKA VETERINARY DIAGNOSTIC LABORATORY

PROCEDURE	Jan.	Febr.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Necropsies	28	53	29	54	48	27	25	34	31	54	51	60	494
Histology	3,313	3,702	4,499	3,352	3,805	3,300	2,990	3,037	3,083	4,434	3,095	3,490	42,100
Bacteriology	975	846	1,330	1,175	1,644	789	329	1,830	1,472	1,523	1,399	648	13,960
PCR/RFLP/Sequencing	264	246	274	214	174	243	836	2,299	649	734	611	685	7,302
Mycology	4	2	4	9	11	7	5	14	11	8	5	8	88
Sensitivity Tests	153	163	256	243	187	138	120	122	146	155	145	148	1,976
FA Tests (Bact.)	0	0	3	2	7	2	4	0	2	3	5	1	29
FA Tests (Viral)	1	11	0	0	0	0	0	1	2	0	0	0	15
EM Exams	6	7	5	16	7	4	3	8	1	4	6	3	70
Toxicology	166	213	186	89	104	32	84	59	94	49	39	80	1,195
Parasitology	294	221	484	396	556	293	36	172	647	755	547	155	4,556
Clinical Pathology	14	10	11	10	14	20	18	25	27	19	15	9	192
Bacterial Serology	83	43	120	124	71	57	18	20	23	21	44	57	681
Viral Serology	6,105	3,106	2,269	3,324	2,950	1,476	6,373	1,953	2,619	3,371	2,849	1,001	42,556
Avian Serology	1,490	1,686	1,695	879	864	2,802	1,575	2,384	667	1,528	1,106	1,919	18,595
Immunohistochemistry	68	72	132	129	93	54	41	75	80	78	59	104	985
BVD Skin Biopsy	27,847	21,233	23,912	23,172	26,022	19,136	14,123	20,505	30,115	35,459	23,124	19,017	283,665
CWD	48	4	1	0	1	6	4	4	1	3	5,823	12	5,907
Scrapie	0	0	0	0	3	1	0	0	0	0	0	0	4
Virus Isolation	34	29	36	20	13	7	16	10	21	28	38	38	290
Rabies	9	6	18	7	7	8	10	11	7	5	7	8	103
BCV, BVD & Rota Elisa	301	342	190	205	230	50	20	23	25	60	46	31	1,523
Pseudorabies	516	287	404	339	188	346	260	198	219	347	353	160	3,617
TOTAL for MONTH	41,719	37,442	35,858	33,759	36,999	28,798	26,890	32,784	39,942	48,638	39,367	27,634	429,903

*Table 7. Number of Accessions, Previous Five Years***

	2002	2003	2004	2005	2006
Lincoln	16,298	15,330	14,485	14,904	15,693
North Platte	795				
Scottsbluff	644				
TOTAL	17,737	15,330	14,485	14,904	15,693

**Totals from 2000 through 2002 included totals from the North Platte and Scottsbluff Labs. (The Scottsbluff lab was closed as of June 30, 2002 and the North Platte lab was closed as of December 30, 2002, due to budget reductions)

Table 8. Number of Laboratory Procedures Conducted Previous Five Years

	2002	2003	2004	2005	2006
Lincoln	342,634	356,129	359,907	368,398	429,903
North Platte*	8,477				
Scottsbluff*	6,276				
TOTAL	357,387	356,129	359,907	368,398	429,903

*North Platte and Scottsbluff totals include referral testing that was sent to the Lincoln laboratory. (Also see note above in regard to closing of Scottsbluff and North Platte labs)

Table 9. ANNUAL REPORT - LAG TIME REPORT
Veterinary Diagnostic Center (January 1, 2006 - December 31, 2006)

Number of Days to Report	All Accessions % Reported (Cumulative %)				Normal Accessions % Reported (Cumulative %)				Pseudorabies Accessions % Reported (Cumulative %)			
	First Report		Final Report		First Report		Final Report		First Report		Final Report	
	Given	%	Sent	%	Given	%	Sent	%	Given	%	Sent	%
0	2.3	2.3	2.3	2.3	2.0	2.0	2.0	2.0	25.3	25.3	25.3	25.3
1	13.7	16.0	13.7	16.0	13.5	15.5	13.5	15.5	30.1	55.4	30.1	55.4
2	13.0	29.0	13.0	29.0	13.0	28.5	13.0	28.5	12.9	68.3	12.9	68.3
3	15.0	44.0	15.0	44.0	15.1	43.6	15.1	43.6	5.4	73.7	5.4	73.7
4	10.5	54.5	10.5	54.5	10.6	54.2	10.6	54.2	8.6	82.3	8.6	82.3
5	15.5	70.0	15.5	70.0	15.6	69.7	15.6	69.7	8.1	90.3	8.1	90.3
6	9.4	79.4	9.4	79.4	9.5	79.2	9.5	79.2	3.8	94.1	3.8	94.1
7	8.4	87.8	8.4	87.8	8.5	87.7	8.5	87.7	2.2	96.2	2.2	96.2
8	3.6	91.4	3.6	91.4	3.7	91.4	3.7	91.4	0.0	0.0	0.0	0.0
9	1.2	92.6	1.2	92.6	1.2	92.6	1.2	92.6	0.5	96.8	0.5	96.8
10	1.1	93.7	1.1	93.7	1.1	93.7	1.1	93.7	0.5	97.3	0.5	97.3
11-15	3.4	97.1	3.4	97.1	3.4	97.0	3.4	97.0	2.2	99.5	2.2	99.5
16-20	0.6	97.7	0.6	97.7	0.6	97.7	0.6	97.7	0.5	100.0	0.5	100.0
21-30	0.7	98.4	0.7	98.4	0.7	98.4	0.7	98.4	0.0	0.0	0.0	0.0
31-50	0.6	99.0	0.6	99.0	0.6	99.0	0.6	99.0	0.0	0.0	0.0	0.0
Over 50	1.0	100.0	1.0	100.0	1.0	100.0	1.0	100.0	1.0	100.0	1.0	100.0

NOTE: Weekends and holidays are included in this report. If a case is not called or faxed out, it will have no record of a first report date. Research cases may or may not have a first and final report date.

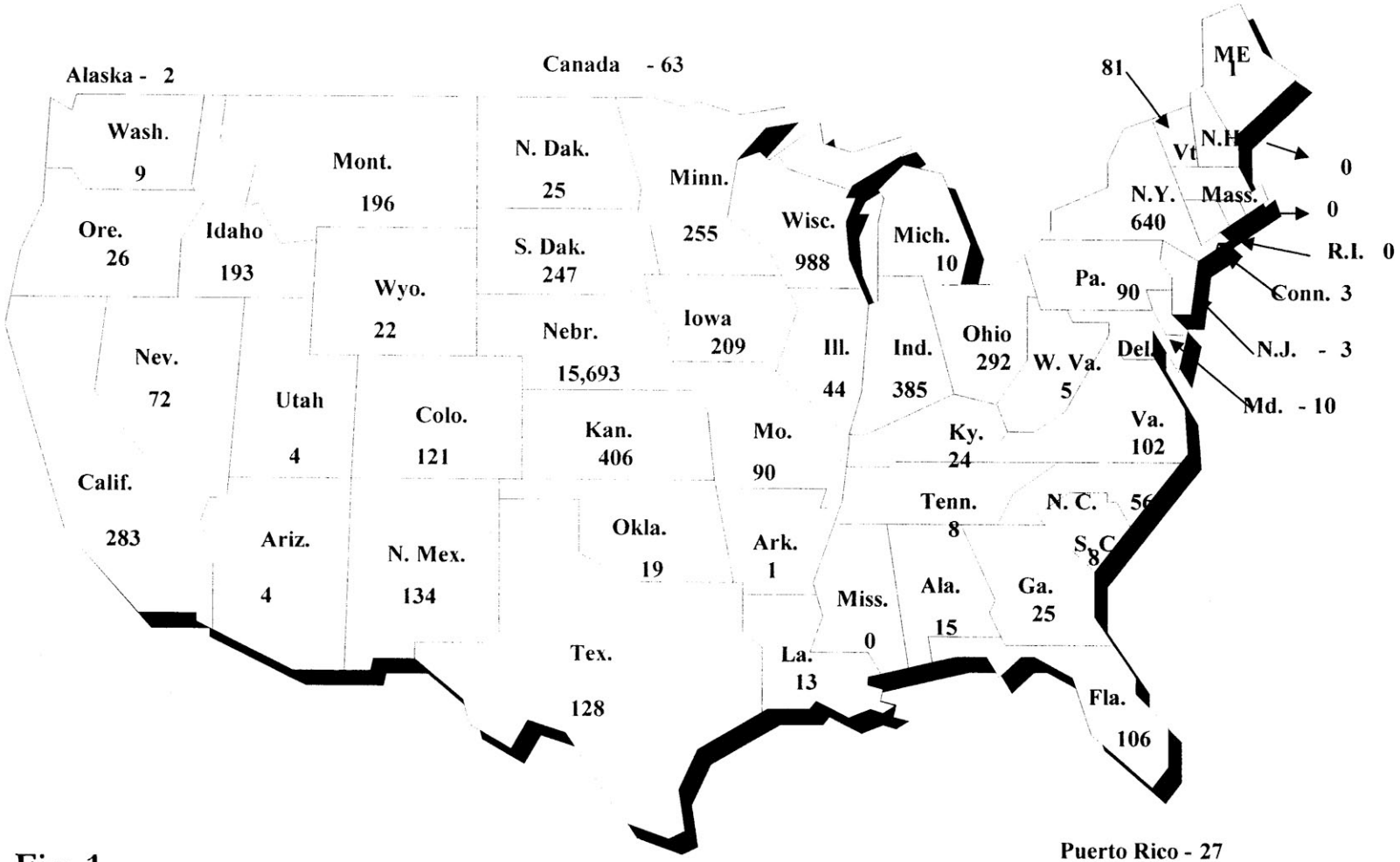


Fig. 1

Distribution of Accessions by State

NVDLS

January 2006 - December 2006

Distribution of Accessions by County

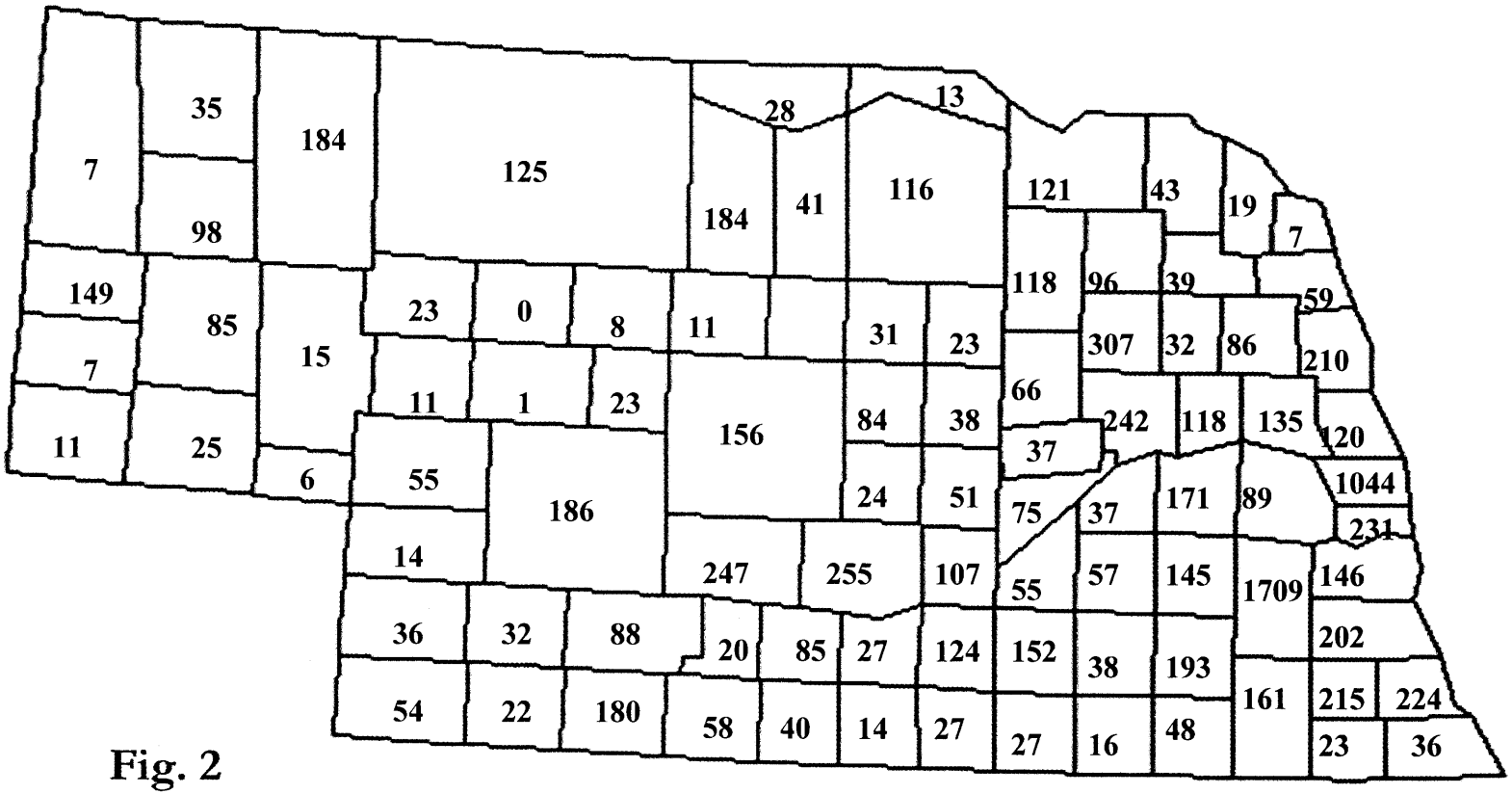


Fig. 2

January 2006 - December 2006

Department OF Veterinary and Biomedical Sciences 2006 Grants and Contracts Program

GRANTS AND CONTRACTS FUNDED IN 2006

Agrisecurity: A Master's Degree Program

A Vidaver, RA Moxley, D Burson and J Partridge. 2006. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES) Higher Education Challenge Grants Program, 09-30-06/08-31-09, $146,948

AI Lab Testing State of Kansas

DJ Steffen and CL Kelling. 2006. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), $21,700

AI Lab Testing for the State of Nebraska

DJ Steffen and CL Kelling. 2006. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), $25,200

Avian Influenza Surveillance

DJ Steffen and CL Kelling. 2006. Nebraska Department of Agriculture, $171,485

Beef Feedlot Cowboy Training Modules

DG Levis, KP Anderson, M Stauffer, AR Wohlers, DD Griffin, DA Lienemann, GE Erickson, TL Mader, IG Rush and DR Smith. 2006. University of Nebraska-Extension, 11-01-05/06-30-06, $6,000

Bovine Viral Diarrhea Virus in North American Alpaca Herds; Prevalence and Implementation of Control Strategies

CL Kelling, DR Smith, DJ Steffen and BW Brodersen. 2006. Alpaca Research Foundation, $23,400

Development of Broad-Spectrum Antibiotics Against Bacterial Pathogens

RG Barletta, R Powers and J Takacs. 2006. ARD Interdisciplinary Research Grant, University of Nebraska-Lincoln, 07-01-06/06-30-07, $20,000

Efficacy of Two and Three Doses of an Experimental *Escherichia coli* Bacterial Extract Serotype O157:H7 Vaccine in Feedlot Cattle Against a Natural-Exposure Challenge with *E. coli* O157

DR Smith, RA Moxley, TJ Klopfenstein and GE Erickson. 2006. Bioniche Animal Health USA, Inc., 06-12-06/06-07, $345,714

Enhancement of Efficacy of PRRSV Vaccines by Altering the Glycosylation Pattern of Viral Glycoproteins

AK Pattnaik and FA Osorio. 2006. National Pork Board, $83,450

Identification of a Putative Viral Co-Factor Different from PCV2, in Animals with PMWS

IH Ansari, AK Pattnaik, FA Osorio and BW Broderson. 2006. University of Nebraska-

Lincoln, National Pork Board, $57,600

Entry Mechanisms of *Mycobacterium marinum* and in Search of Environmental Reservoirs for *Mycobacterium* paratuberculosis

RG Barletta and J Cirillo. 2006. National Institute of Health (NIH), University of Nebraska-Lincoln, Subcontract to Texas A&M University, 06-01-06/09-30-06, $16,549

Environmental Regulation of *Staphylococcus epidermidis* PIA Synthesis

GA Somerville. 2006. National Institutes of Health, $274,000

Functional Analysis of Proteins Encoded by the BHV-1 Latency Related Gene

CJ Jones. 2006. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program, 09-15-06/09-14-09, $374,585

Genetic Basis of Resistance to Food-Borne Bacterial Pathogens

GE Duhamel and JS Weber. 2006. NEB 14-137; IANR Interdisciplinary Research Program, United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), $40,000

Genome-Wide Screening of Host Genes Involved in Virus-Induced Neurotoxic Signaling Using Lentiviral siRNA Library

CJ Jones and Tsuneya Ikezu. 2006. Nebraska Center for Virology Seed Grant; 04-01-06/03-31-07, $40,000

***Helicobacter*-Associated Colitis of *Callitrichidae* Kept in Zoo Exhibits**

GE Duhamel. 2006. Morris Animal Foundation, $30,212

Japanese Agricultural Training Program, Phase III, Institutional Training

D Beermann, T Doane, M Turner, PJ Kononoff, DR Smith, BR White, SJ Jones, RA Moxley, GE Erickson, AS Cupp, S Scheideler, R Rasby and LL Larson. 2006. Japanese Government, 01-07-06/03-31-06, $70,896

JDIP: Johne's Integrated Program in Research, Education and Extension

V Kapur and RG Barletta. 2006. United States Department of Agriculture (USDA), National Research Initiative Integrated Program (NRIIP), University of Nebraska-Lincoln Subcontract, 04-15-2006/04-14-2007, $57,363

NDA Johne's Diagnostics

Smith DR. 2006. Nebraska Department of Agriculture, 06-04-05/06-03-06, $25,000

NDA Bovine Spongiform Encephalopathy Education

Smith DR. 2006. Nebraska Department of Agriculture, 09-25-06/05-01-07, $11,000

Polymicrobial Associations in Inflammatory Bowel Disease

GE Duhamel. 2006. National Institute of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), $141,768

Proline Metabolism and Redox Homeostasis in Gastrointestinal Bacterial Diseases
GE Duhamel and DF Becker. 2006. University of Nebraska-Lincoln, Layman Award, International Reference Laboratory for Spirochetal Colitis Research, $10,000

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines
FA Osorio and AK Pattnaik. 2006. National Pork Board, 10-01-05/09-30-06, $150,000

Replication and Assembly of Vesicular Stomatitis Virus
AK Pattnaik. 2006. National Institute of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), 04-01-07/03-31-12 , $1,945,346

REU Site: Training in Redox Biology
GA Somerville, Don Becker and Steve Ragsdale. 2006. National Science Foundation, $180,000

Undergraduate Project Program - Graduate Recruitment Fellowship Grant
GE Duhamel. 2006. $2,500

Undergraduate Honors Program
GE Duhamel. 2006. University, Industry and Practitioners, $12,165

University of Nebraska-Lincoln, Office of Graduate Studies Fellowship
GE Duhamel. 2006. $1,000

West Nile Surveillance
DJ Steffen and CL Kelling. 2006. Nebraska Department of Health, $28,000

ACTIVE GRANTS AND CONTRACTS CONTINUED FROM PREVIOUS YEARS

Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach

AK Pattnaik. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-01-04/08-31-07, $320,000

Analyses of Virulence and Attenuation Determinants of PRRSV Using Reverse Genetic Approach

AK Pattnaik and FA Osorio. United States Depatment of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-01-2004/08-31-2007, $320,000

Analysis of BHV-1 Present in Aborted Fetuses

CJ Jones. Pfizer, Inc, Recent outbreaks of BHV-1 have occurred in certain breeding stock following vaccination. We will compare the clinical isolates to the input vaccine strains, 09-01-04/08-31-06, $60,000

Assessment of Health and Reproductive Status of River Otter in Nebraska

Steffen DJ, MP Carlson and DG Rogers. Nebraska Game and Park's Commission, 2003-2005, $12,400

Beef Feedlot Cowboy Training Modules

Levis DG, KP Anderson, M Stauffer, AR Wohlers, DD Griffin, DA Lienemann, GE Erickson, TL Mader, IG Rush and DR Smith. University of Nebraska-Lincoln, Extension Division, 11-01-05/6-30-06, $6,000

Bovine Genetics Quality Assurance

DJ Steffen. 2004-2005. National Association of Animal Breeders, $12,000

Bovine Viral Diarrhea Virus in North American Alpaca Herds

CL Kellling, DR Smith and DJ Steffen. Alpaca Research Foundation, IANR/CEHS Associated Faculty, 01-01-2006/01-01-2007, $23,400

Develop Pre-Harvest Version of the USDA-FSIS Fast Antibiotic Screening Test (FAST) and Antibiotic Residue Avoidance Education

DD Griffin, S Hinkley and HE Cerny. 2002. United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES), Validate the USDA FAST screening procedure and develop a pre-harvest version, including residue avoidance educational materials, $185,746

Integrating Biosecurity Practices into Livestock Production Management

GP Rupp, DD Griffin, AM O'Connor and PJ Chenoweth. 2002. United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES), The development of a biosecurity education system for beef, dairy and sheep producers and their veterinarians in Nebraska, Iowa and Kansas, $249,792

Develop an Animated Product to Teach Neurohumoral Transmission Across Synapses in the Autonomic Nerve System

MP Carlson and L Larson. 2005. IANR Innovation Grant, IANR Communication and Information Technology (CIT), 05-01-06/04-30-07, $5,000

Effect of Vaccinating Against Type III Secretory Proteins of *Escherichia coli* O157:H7 on the Occurrence of *E. coli* O157:H7 on Hides Pre- and Post-Harvest

Klopfenstein TJ, RE Peterson, DR Smith, GE Erickson, RA Moxley and S Hinkley. National Cattlemens Beef Association, 11-04/11-05, $42,525

Enhancement of Efficacy of PRRSV Vaccines by Altering the Glycosylation Pattern of Viral Glycoproteins

AK Pattnaik and FA Osorio. National Pork Board, 12-15-05/12-14-06, $83,000

Functional Analysis of bICP0, a BHV-1 Gene that is a Promiscuous Trans-Activator

CJ Jones. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-01-2005/08-30-2008, $350,000

Functional Genomic Analysis of Bovine Viral Diarrhea Virus

RO Donis and CL Kelling. 2004. United States Department of Agriculture (USDA), National Research Initiative Grant (NRIG), $275,000

Herd Immunity -Vaccination against *E. coli* O157:H7

TJ Klopfenstein, DR Smith, GE Erickson and RA Moxley. Nebraska Beef Council, 03-05/12-05, $50,000

Identification and Characterization of *Mycobacterium* paratuberculosis Virulence Genes Expressed *in vivo* by Negative Selection

NY Shpigel (Hebrew University), I Rosenshine (Hebrew University) and RG Barletta. United States Department of Agriculture (USDA), Binational Agricultural Research and Development Fund, 10-01-05/09-30-08, $143,000

Identification and Characterization of PRRSV Immunogenic Subunits Using Viral Vectors

AK Pattnaik. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), NC-229, subcontract: University of Minnesota, 10-01-05/01-14-07, $60,304

Implement a Program to Ensure the Future Supply of Well-Trained Rural Veterinarians to Provide Public Health, Homeland Security, Food Safety, and Veterinary Services to Rural America

DD Griffin, GP Rupp, AM O'Connor and LC Hollis. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Exension Service (CSREES), 10-13-2002, extended 2007, $124,810

Influence of Enterotoxins on Virulence and Colonization of the Porcine Intestine by *Escherichia coli*

RA Moxley and DH Francis. United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES), National Research Initiative Competitive Grants Program (NRICGP), Area 44.0, Animal Protection, 09-01-04/08-31-07, $270,000

Integrating Biosecurity Practices into Livestock Production Management on Farms and Ranches to Insure a Sustainable and Wholesome Food Supply

GP Rupp, DD Griffin, AM O'Connor and PJ Chenoweth. 2002. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), the development of a biosecurity education system for beef, dairy and sheep producers in concert with their veterinarians and extension specialists, $249,792

Intervention Strategies to Reduce *Escherichia coli* O157:H7 in Beef Feedyards

DR Smith, GE Erickson, RA Moxley, TJ Klopfenstein and S Hinkley. United States Department of Agriculture (USDA), National Research Initiative Integrated Program (NRIIP) Cooperative State Research, Education, and Extension Seervice (CSREES), Food Safety Initiative, 10-30-03/10-29-06, $500,000

JDIP: Johne's Disease Integrated Program in Research, Education and Extension

V Kapur (University of Minnesota) et al., RG Barletta. United States Department of Agriculture (USDA), National Research Initiative Integrated Program, (NRIIP), University of Nebraska-Lincoln, subcontract, 04-15-2004/04-14-2006, $51,122

Johne's Disease Herd Testing

DJ Steffen. 2004-2005. Nebraska Department of Agriculture, $60,000

Bovine Genetics Quality Assurance

DJ Steffen. National Association of Animal Breeders, 01-01-2005/06-30-2006, $12,000

Mentorship of Veterinary Student with Veterinarians Serving Rural Communities

DD Griffin and GP Rupp. 2005. United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES), $124,810

Molecular Analysis of a *Mycobacterium* paratuberculosis Colony-Morphology Attenuated Mutant

RG Barletta and CJ Czuprynski (University of Wisconsin). United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), Sustaining Animal Health and Well Being, 02-01-2004/01-31-2007, $270,000

Nebraska Center for Viral Pathogenesis

Y (Joe) Zhou. National Center for Research Resources (NCRR) National Institute of Health (NIH), Microscopy Core Facility Support subcontract, 09-01-05/08-30-10

Protein-thiol Mixed Disulfides in Cataractogenesis

MF Lou. National Institute of Health (NIH), the study of the biochemical mechanism of cataract formation, 07-01-03/06-30-07, $1,794,300

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines

FA Osorio and AK Pattnaik. Second Year Renewal, National Pork Board, 07-01-2005/06-30-2006, extended 06-01-2007, $150,000

Redox Biology Center

GA Somerville. 2004. Redox Biology Center start-up funds, $450,000

Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related Gene

CJ Jones. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 11-01-2003/10-30-2006, $320,000

Research Plan for *Mycobacterium* tuberculosis

RG Barletta. National Institutes of Health (NIH) and The Institute for Genomic Research (TIGR), Obtained DNA Microarrays, 05-11-2005/present, costs of microarrays, $15,000

Research Plan for *Mycobacterium* smegmatis

RG Barletta. National Institutes of Health (NIH) and The Institute for Genomic Research (TIGR), Obtained DNA Microarrays, 05-11-2005/present, costs of microarrays, $15,000

Role of A/E Proteins in *E. coli* O157:H7 Intestinal Colonization of Adult Cattle

RA Moxley. United States Deprtment of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES) National Research Initiative Competitive Grants Program (NRICGP), Area 32.0, Food Safety, #01-02966, 12-01-01/12-31-06, $370,000

Role of Hyaluronan Matrix in Prostate Cancer Progression

MA Simpson and Y (Joe) Zhou. Consultant, National Institute of Health (NIH), National Cancer Institute, 07-01-05/06-30-10

Role of Non-Structural Proteins in Pestivirus Assembly

RO Donis and CL Kelling. National Institute of Health (NIH), $289,116

Stability of the LR Mutant Virus in Calves

CJ Jones. Fort Dodge Animal Health, 10-01-05/9-30-06, $60,000

Sub-typing of PRRSV Isolates by Means of Measurement of Cross-Neutralization Reactions

FA Osorio. National Pork Board, 11-01-2004/10-31-2005, Extended 06-2006, $42,000

Surveillence for Chronic Wasting Disease in Nebraska Deer

DJ Steffen. Nebraska Game and Parks Commission, IANR/CEHS Associated Faculty 02-24-2006/08-31-2006, $170,000

Training Junior Faculty Members and Establish a Research Center for Redox Biology

R Banerjee and MF Lou. Redox Biology Center Cobra Grant, National Institute of Health (NIH) grant, 2002-2007, $8,269,843

Tricarboxylic Acid Cycle-Dependent Environmental Regulation of *Staphylococcus epidermidis* Polysaccharide Intercellular Adhesin Production

GA Somerville. 2006. University of Nebraska-Lincoln Foundation, Layman Award, $7,839

Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virus for the Study of PRRSV Pathogenesis and *in vivo* Tropism

FA Osorio and AK Pattnaik. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-01-05/08-31-06, extended 08-31-07, $129,600

Viral Vectors to Assess PRRSV Immunogenic Subunits

FA Osorio, M Murtaugh, AK Pattnaik, S Chowdhury and C Gaignon. Sub-contract: Integrated Control and Elimination of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) in the US, United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 07-01-2004/06-30-2005, extended to 12-2006, 4.4 M

Vitamin-Dependent Modifications of Histones

J Zempleni and MF Lou. National Institute of Health (NIH), Study the functions of vitamin in cell proliferation, 2003-2007, $1,087,586

VSV RNA Transcription and Replication

AK Pattnaik. National Institute of Allergy and Infectious Diseases (NIAID), National Insittute of Health (NIH), 03-01-01/02-28-06, extended 02-28-07, $1,454,920

COMMODITY

Bovine Genetics-Quality Assurance Research Program

DJ Steffen. National Association of Animal Breeders. Status renewal funded - 1997-1998, $15,000; 1998-1999, $12,000; 1999-2000, $12,000; 2000-2001, $12,000; 2001-2002 $12,000; 2002-2003 $12,000; 2003-2004 $12,000; 2004-2005 $12,000, total funding, $109,000

Chronic Wasting Disease Surveillance in Deer

DJ Steffen. 2002-2003. Nebraska Game and Parks Commission, contract $85,000

Control of Johne's Disease

DJ Steffen. Laboratory enhancement, Nebraska Department of Agriculture, 2004, $25,000

CWD Validation of the ELISA Assay For Use in White-Tailed Deer
DJ Steffen. 2002-2003. Bio-Rad Reagents $60,600 CWD test kits; equipment plate reader and two ribolyzers $35,803, total value $100,803

Evaluation of Automated Meat Recovery Systems
DJ Steffen. Dr. Thipareddi, Department of Food Science and Technology subcontract. 2003, $7,430

Evaluation of Anthrax Rapid Detection Kits
DJ Steffen. Nebraska Department of Agriculture. 2003-2004, $475.00

Genetic Disease Diagnosis and Consulting
DJ Steffen. American Simmental Association. 2003, $4,900

Induction of Protective Immunity Against Systemic BVDV1 and BVDV2 Infection
CL Kelling and DJ Steffen. Schering-Plough Animal Health. 2003-2004, $144,000

Johne's Disease Herd Testing
DJ Steffen. Nebraska Department of Agriculture. 2003, $1,009

Pseudorabies Eradication and Control
DJ Steffen. Nebraska Department of Agriculture Testing. 2003, $22,994

Scrapie Program
DJ Steffen. United States Department of Agriculture (USDA). 2002-2003, $61,000

West Nile Surveillance and Serologic Response in Horses
DJ Steffen. Nebraska Department of Agriculture. 2003-2004, $2,940

West Nile Surveillance
DJ Steffen. Nebraska Department of Health Human Services. 2003-2004, $93,200

INDUSTRY

Porcine Reproductive and Respiratory Syndrome (PRRS): Methods of the Integrated Control, Prevention and Elimination of PRRS in United States Swine Herds
Osorio FA, R Johnson, J Weber, AR Doster and AK Pattnaik. 2006. NC-229. $25,000

STATE

Effects of CLA on Fat Metabolism in Mice
Fromm M, J Miner and AR Doster. 2006. Center for Biotechnology, University of Nebraska-Lincoln, Lincoln, NE, $25,000

REVENUES GENERATED

International Reference Laboratory for Spirochetal Colitis Research

GE Duhamel. University, Industry and Practitioners, 1995-2006, $37,405

Stimulating the Development of Veterinarians to Serve Rural America

DD Griffin and GP Rupp. 2005. United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES), mentorship of veterinary students with veterinaians serving rural communities, $124,810

Department of Veterinary and Biomedical Sciences
2006 Grant Proposals Submitted

A Mutant Deleted for Most of the Herpes Simplex Virus Type 1 (HSV-1) UOL Gene Does Not Affect the Spontaneous Reactivation Phenotype in Rabbits

Chan D, J Cohen, J Naito, KR Mott, N Osorio, L Jin, NW Fraser, CJ Jones, SL Wechsler and G Chuen Perng. 2006. Journal of Neurovirology, 12:5-16

Agrisecurity: A Master's Degree Program

Vidaver A, RA Moxley, D Burson and J Partridge. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES) Higher Education Challenge Grants Program, 01-30-06, $146,948

Chracterization of Effects of BVDV Infection on Immune Responses in Alpacas

Bedenice D, CL Kelling, DJ Steffen, CL Topliff, DRSmith, BW Brodersen and W Davis. Alpaca Research Foundation, $39,916

Development of Broad-Spectrum Antibiotics Against Bacterial Pathogens

Barletta RG, R Powers and J Takacs. Agriculture Research Division (ARD) Interdisciplinary Research Grant, University of Nebraska-Lincoln, 07-01-06/06-30-07, $20,000

Does the HSV-1 Latency Associated Transcript (LAT) Encode a Protein?

Jones CJ. National Institute of Health (NIH), 07-07/06-30-09, $401,500

Efficacy of Two and Three Doses of an Experimental *Escherichia coli* Bacterial Extract, Serotype O157:H7 Vaccine in Feedlot Cattle Against a Natural-Exposure Challenge with *E. coli* O157

Smith DR, RA Moxley, TJ Klopfenstein and GE Erickson. Bioniche Life Sciences, 04-05-06, $345,715

Exploiting Staphylococcal Metabolism to Prevent Biofilm Associated Heart Infections

Somerville GA. 2006. American Heart Association, $143,000

Functional Analysis of Proteins Encoded by the BHV-1 Latency Related Gene

Jones CJ. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-15-06/09-14-09, $374,585

Functional Analysis of Bovine Herpesvirus 1 (BHV-1) Genes Expressed During Latency

Jones CJ, V Geiser, GA Henderson, Y Jiang, F Meyer, S Perez and Y Zhang. 2006. Veterinary Microbiology, 113:199-210

HSV-1 ICP0 Localizes in the Stromal Layer of Infected Rabbit Corneas and Predominantly Resides in the Cytoplasm and/or Perinuclear Region of Rabbit Keratocytes

Morishige N, JV Jester, J Naito, N Osorio, A Wahlert, CJ Jones, RD Everett, SL Wechsler and GC Perng. 2006. Journal of General Virology, 87:2817-2825

JDIP: Johne's Integrated Program in Research, Education, and Extension

Kapur V (University of Minnesota) et al. United States Department of Agriculture (USDA), National Research Initiative Integrated Program (NRIIP), 04-15-2007/04-14-2008, subcontract, $65,551

Localization of Sequences Within the Latency Related Gene of Bovine Herpesvirus 1 that Inhibit Mammalian Cell Growth

Geiser V and CJ Jones. 2005. Journal of Neurovirology, 11:563-570

Manipulating Staphylococcus Aureus Aerobic Metabolism to Prevent Biofilms

Somerville GA. 2006. National Center for Research Resources, $300,000

***Mycobacterium* avium subsp. paratuberculosis Pathogenesis**

Bermudez LE (Oregon State University) and RG Barletta. United States Department of Agriculture (USDA) National Research Initiative Competitive Grants Program (NCICGP), 44.0A Animal Protection: Animal Disease, 09-01-07/08-31-09, $500,000

National Animal Health Laboratory Network (NAHLN)

Griffin DD. United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES), 2006, $50,000

Pharmaco-Manipulation of Simvastatin-Induced Bone

Duhamel GE and RA Reinhardt. National Institute of Health (NIH), National Institute of Dental and Craniofacial Research, 2007-2009, $412,608

Regulation of Senescence and Apoptosis in Eukaryotes

Lou MF. National Science Foundation (NSF), EPSCoR RII cluster grant, 01-01-07/12-31-10, $2,502,000

Replication and Assembly of Vesicular Stomatitis Virus

Pattnaik AK, SC Das and Y Zhou. 2006. National Institute of Health (NIH), 05-31-06, $1,945,346

Residue Avoidance Education for Dairy and Beef Producers and Their Veterinarians

Griffin DD. National Cattlemen's Beef Association. 2006, $20,000

The Role of Arachidonic Acid in Growth Factor Signaling

Lou MR and KY Xing. National Institute of Health (NIH), 11-01-06/10-30-10, $1,022,000

The Bovine Herpes Virus 1 (BHV-1) Immediate Early Protein (bICP0) Interacts With the Histone Acetyltransferase p300, and These Interactions Correlate with Stimulation of gC Promoter Activity

Zhang Y, Y Jiang, J Zhou, V Geiser and CJ Jones. 2006. Journal of General Virology, 87:1843-1851

The Role of Protein-Thiol Mixed Disulfide in Cataractogenesis

Lou MF. National Institute of Health (NIH), 07-01-07/06-30-11, $2,024,298

GRANTS RELATED TO TEACHING

Howard Hughes Medical Institute Fellowship for Summer Undergraduate Research

Duhamel GE. Senior Undergraduate Project, Nebraska Wesleyan University; 2002, $2,500; 2003, $2,500; 2004, $2,500; 2005, $2,500

Undergraduate Creative Activities and Research Experiences Program (UCARE)

Duhamel GE. Undergraduate Project, 2002-03, $2,000; 2004, $2,000; 2005, $4,000

PRIVATE INDUSTRY

Evaluation of Compounds

Lou MF and P Kador (UNMC). Hoffman LaRoche Company, 03-01-05/02-28-06, $318,607

Evaluation of Disulfide Reducing Agent (in particular thioltransferase enzyme) for Correcting Lens Accommodation (presbyopia)

Lou MF. NewLens Company.

Department of Veterinary and Biomedical Sciences Grants Submitted, Not Funded in 2006

Attenuated Recombinant Noncytopathic Bovine Viral Diarrhea Virus Genoytpe 1 and 2 Vaccines

Kelling CL, CL Toplff and DJ Steffen. United States Department of Agriculture (USDA) National Research Initiative (NRI), $350,564

Developing a Regionalized, State-Based, Herd-Centered, Voluntary Bovine Viral Diarrhea Virus (BVDV) Control Program in the USA

Rupp GP, JA Schmitz, DD Griffin, BW Brodersen, CL Kelling and DJ Steffen. 2006. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), not funded, $370,000

Functional Tissue Engineering of Articular Cartilage

Subramanian A, G Larsen, DJ Steffen and J Turner. 2006. National Institute of Health (NIH), not funded, $1,400,000

Influence of Respiratory Epithelial Cells on Immunue Responses in Polymicrobial Bovine Respiratory Disease

Woolums AR, T Krunkosky, R Tripp, D Hurley and CL Kelling. 2006. United States Department of Agricultrue (USDA) National Research Initiative (NRI), not funded, $199,361

Nebraska Center for Bacterial Pathogenesis Research

Somerville GA. 2006. Nebraska Research Initiative, not funded, $240,000

Reverse Genetics Aproach to Functional Analysis or Bovine Respiratory Syncytial Virus Fusion Glycosylation

Kelling CL, CL Topliff and DJ Steffen. 2006. United States Department of Agriculture (USDA), National Research Initiative (NRI), not funded, $345,570

Targeting [Fe-S] Cluster Assembly to Treat Biofilm Infectious Disease: Feasibility

Somerville GA. 2006. National Institutes of Health (NIH), not funded, $368,843

Department of Veterinary and Biomedical Sciences Five-Year Record of Grants and Contracts (2001-2006)

A New Approach to Control of Human Pathogenic Fungi: Investigation of Farnesol and Farnesol Analogs in a Mouse Model

Duhamel GE and KW Nickerson. 2001-2004. Tabacco Settlement Biomedical Research Enhancement Fund Research, Seed Grant Program, $45,000

A Novel Strategy to Test and Monitor Beef Feedlot Food-Safety Control Points

Smith DR, LL Hungerford, JT Gray, RA Moxley, TJ Klopfenstein and CT Milton. NEB-14-111, 10-00/10-04, $953,735

A Plan for Obtaining More Accurate and Specific Results on PRRSV Serological Tests When Using Commercial ELISAs

Osorio FA. National Pork Producers Council, 04-01/03-02, $15,000

An Accurate Determination of the Proportion of Beef Cattle with Johne's Disease and the Factors Explaining Herd Status

Smith DR United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) VS Johne's Disease Cooperative Agreement, 10-03/10-04, $100,000

Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach

Pattnaik AK. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program, (NRICGP), 09-01-04/08-31-07, $320,000

Analysis of Apoptosis and Pathogenesis by Bovine Herpesvirus 1 and bICP0

Jones CJ. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 10-01-98/09-30-2001, $178,338

Animal Model of Transmissible Neurofibromas

Schmale M and AK Pattnaik. National Institutes of Health (NIH), 04-01-02/03-31-05, $574,000

Avian Influenza Surveillance #18-05-138

Steffen, DJ and Clayton Kelling. Nebraska Department of Agriculture, 05-08-06/05-07-07, $171,485

Bovine Genetics Quality Assurance

Steffen DJ. 2005-2006. National Association of Animal Breeders, $12,000

Bovine Viral Diarrhea Virus in North American Alpaca Herds

Steffen DJ. Alpaca Research Foundation, 01-01-06/01-01-07, $23,400

Characterization of Group A Bovine Rotavirus Strain B641
Duhamel GE. 2002. ImmuCell Corp, $5,000

Chronic Wasting Disease Surveillance in Deer
Brodersen BW. 2002-2004. Nebraska Game and Parks Commission, $198,000

Chronic Wasting Disease Surveillance in Deer
Steffen DJ. Nebraska Game and Parks Commission, 09-01-05/06-30-06, $45,000

Classical Swine Fever Surveillance
Steffen DJ. Nebraska Department of Agriculture, 05-01-06/12-31-06, $20,000

Classical Swine Fever Surveillance
Steffen DJ. United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS), 10-01-05/12-31-06, $86,175

Competitive Exclusion as an *E. coli* O157:H7 Intervention Strategy Phase II
Klopfenstein TJ, DR Smith, RA Moxley, GE Erickson and S Hinkley. Nutrition Physiology Corporation, 05-03/12-03, $50,000

Competitive Exclusion and Vaccination as *E. coli* O157:H7 Intervention Strategies
Smith DR, TJ Klopfenstein, RA Moxley, GE Erickson and S Hinkley. Nutrition Physiology Corporation, 05-01-02/12-31-02, $41,700

Competitive Exclusion as an *E. coli* O157:H7 Intervention Strategy — 2004 Phase II Study
Klopfenstein TJ, DR Smith, RA Moxley, GE Erickson and S Hinkley. Nutrition Physiology Corporation, 05-01-04/12-31-04, $100,000

Competitive Exclusion and Vaccination as *E. coli* O157:H7 Intervention Strategies
Smith DR, TJ Klopfenstein, RA Moxley, GE Erickson and S Hinkley. Nebraska Beef Council, 05-01-02/12-31-02, $50,000

Development and Validation of a System to Utilize Liquid Culture Media for Johne's Disease Fecal Culturing in Nebraska
Steffen DJ. Nebraska Department of Agriculture, 10-01-05/06-30-06, $53,000

Distribution of *Brachyspira pilosicoli* Attachment Phenotypes Among Pigs of Three Breeds
Duhamel GE. 2002. Novartis Animal Health United States, Inc, $12,450

Effect of Virus Infection on Cellular Glutathione Concentration
Brink DR, L Matulka, CL Kelling and S Srikumaran. 2002-2003. Agriculture Research Division (ARD) Interdisciplinary Research Grant Proposal, $20,000

Effect of Vaccinating Against Type III Secretory Proteins of *Escherichia coli* O157:H7 on the Occurrence of *E. coli* O157:H7
Klopfenstein TJ, RE Peterson, DR Smith, GE Erickson, RA Moxley and S Hinkley. 11-04/11-05, $42,525

Effect of Virus Infection on Cellular Glutathione Concentration

Brink DR, L Matulka, CL Kelling and S Srikumaran. 2001. Agriculture Research Division (ARD) Interdisciplinary Research Grant Proposal, $20,000

Effect of Vaccinating Against Type III Secretory Proteins of *Escherichia coli* O157:H7 on the Occurrence of *E. coli* O157:H7 on Hides Pre- and Post-Harvest

Klopfenstein TJ, RE Peterson, DR Smith, RA Moxley GE Erickson and S Hinkley. National Cattlemen's Beef Association, 02-01-05/09-30-05, $42,525

Enhancement of Efficacy of PRRSV Vaccines by Altering the Glycosylation Pattern of Viral Glycoproteins

Pattnaik AK and FA Osorio. National Pork Board, 12-15-05/12-14-06, $83,000

Ensuring Meat Safety: *E. coli* O157:H7 — Progress and Challenges

Hutkins R, A Benson and RA Moxley. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), National Research Initiative Competitive Grants Program (NRICGP), 10-01-02/09-30-03, $38,150

Evaluation of Commercially Available Serologic Marker Systems for Foot-and-Mouth Disease

Osorio FA. Specific Cooperative Agreement, United States Department of Agriculture (USDA) Agricultural Research Service (ARS), 06-02/03-05, $97,700

Evaluation of a Competetive Exclusion Product to Reduce the Prevalence of Fecal Shedding of *E. coli* O157:H7

Klopfenstein TJ, DR Smith, RA Moxley, LL Hungerford and S Hinkley. Nutrition Physiology Corporation, 03-26-01/9-30-02, $50,000

Evaluation of Intervention Strategies to Reduce the Prevalence of Fecal Shedding of *E. coli* O157:H7

Smith DR, TJ Klopfenstein, RA Moxley, LL Hungerford, S Hinkley, M Brashears and S Younts. Nebraska Beef Council, 03-26-01/09-30-02, $100,000

Evaluation of a Competitive Exclusion Product to Reduce the Prevalence of Fecal Shedding of *E. coli* O157:H7

Smith DR, TJ Klopfenstein, RA Moxley, LL Hungerford, S Hinkley, M Brashears and S Younts. Nutrition Physiology Corporation, 03-26-01/09-30-02, $50,000

Experimental Evaluation of Efficacy of Commercially Available PRRSV Vaccines

Osorio FA. SYVA labs, Spain, 04-15/07-31-05, $45,502

Field Research to Identify Risk Factors for the Occurrence of *Escherichia coli* in Cattle Feedlots

Smith DR, RA Moxley and Klopfenstein TJ. 07-1-01/06-30-02, $100,000

Functional Genomic Analysis of *Mycobacterium paratuberculosis*

JP Bannantine (National Animal Disease Center), V Kapur (University of Minnesota), SJ Wells (University of Minnesota), RG Barletta and JR Stabel (National Animal Disease Center). United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 01-02-03/01-01-05, $285,000

Genetic Disease Research

Steffen DJ. American Simmental Association, 07-02-05/06-30-06, $2,500

Group A Bovine Rotavirus: Characterization of Challenge Materials and Reference Strains

Duhamel GE. 2003-2004. Novartis Animal Vaccines, Inc, $19,854

Helicobacter-Associated Colitis of Callitrichidae Kept in Zoo Exhibits #D05ZOO-007

Gerald Duhamel, DL Armstrong, LJ Lowenstein and BA Rideout (CEHS). Morris Animal Foundation, 10-01-05/11-14-07, $29,948

Herd Immunity — Vaccination for *E. coli* O157:H7

Klopfenstein TJ, DR Smith, GE Erickson and RA Moxley. Nebraska Beef Council, 06-01-05/12-31-05, $50,000

Identification and Characterization of Cellular Apoptosis-Induced Proteins by Proteomics and Proteinchip Technologies

Jones CJ. Strategic Areas Research Grant for the UNL Tobacco Settlement Biomedical Research Enhancement, 10-01/4-03, $198,750

Identification and Characterization of *Mycobacterium paratuberculosis* Virulence Genes Expressed *in vivo* by Negative Selection

Shpigel NY, I Rosenshine, M Chaffer and RG Barletta. United States Department of Agriculture (USDA), Binational Agricultural Research and Development Fund, 12-31-03/12-30-04, $100,000

Identification and Characterization of PRRSV Immunogenic Subunits Using Viral Vectors

Pattnaik AK. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), NC-229, Subcontract, University of Minnesota, 10-01-04/09-30-05, $60,304

Identification of *Mycobacterium paratuberculosis* Virulence Determinants

Barletta RG and CJ Czuprynski (University of Wisconsin). United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Sustaining Animal Health and Well Being, 09-99/8-02, $210,000

Inhibition of Apoptosis by the Bovine Herpesvirus 1 Latency Related Gene

Jones CJ and AR Doster. 2006. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $292,000

Immunochromatographic Strip Assays for Detection of Bovine Group A Rotaviruses and Coronavirus

Duhamel GE. 2002. QUELAB Lab, Inc, $4,750

Induction of Protective Immunity Against Systemic BVDV1 and BVDV2 Infection

Kelling CL and DJ Steffen. Schering-Plough Animal Health, $144,000

Inhibition of Apoptosis by the Bovine Herpesvirus 1 (BHV-1) Latency Related Gene Products

Jones CJ. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 10/01/00-09/30/03, $292,000

Integrating Biosecurity Practices into Livestock Production Management on Farms and Ranches to Ensure a Sustainable and Wholesome Food Supply

Rupp GP, DD Griffin, LL Hungerford and DR Smith. United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES) Higher Education Challenge Grant, $249,792

Interlab Validation of Multiplex PCR Utilizing the Bio-Plex Multi-Array Suspension System

Steffen DJ. United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS), 11-01-05/11-01-06, $72,500

Intervention Strategies to Reduce *Escherichia coli* O157:H7 in Beef Feedyards

Smith DR, GE Erickson, RA Moxley, TJ Klopfenstein and S Hinkley. United States Department of Agriculature (USDA) Cooperative State Research, Education, and Extension Serivce (CSREES), National Integrated Food Safety Initiative (NIFSI), 10-03/9-06, $500,000

Isolation and Characterization of Mycobacteriophages

Barletta RG. California Pacific Medical Center Research Institute, Subcontract to Phage Therapeutics, Inc, Bothell, WA, 02-15-01/02-14-02, $69,495

Johne 's Disease Program #18-05-121

Steffen DJ. 2005-2006. Nebraska Department of Agriculture, develop and validate a system to utilize liquid culture media for Johne's Disease fecal culturing in Nebraska, $53,000

Johne's Disease Herd Testing #18-05-107

Steffen DJ, CL Kelling, DR Smith and BW Brodersen. Nebraska Department of Agriculture, 11-01-05/11-01-06, $559,071

Johnes Disease Testing #18-05-107

Steffen DJ. Nebraska Department of Agriculture, 06-04-06/12-30-06, $20,000

Johnes Disease Testing #18-05-107

Steffen DJ. Nebraska Department of Agriculture, 06-04-06/12-31-06, $48,000

Laboratory Diagnostic Investigations of Enteric Bacterial Diseases of Grower Pigs

Duhamel GE. 2000-2002. Novartis Animal Health United States, Inc, $5,840

Lifetime use of Feed Grade Antimicrobials

Brumm MC and BW Brodersen. 2003. Elanco Animal Health

Limiting Starch in the Diet

Klopfenstein TJ, RA Moxley, CT Milton, DR Smith, LL Hungerfor and JT Gray. Nebraska Beef Council, 04-00/04-01, $16,700

Macrophage Cell-Lines for *in vitro* Propagation of Porcine Reproductive and Respiratory Syndrome Virus

Srikumaran S and AK Pattnaik. National Pork Board, 10-01-04/09-30-04, $100,000

Measure Incidence of *E. coli* O157:H7 in Beef Cattle Vaccinated at Ranch or at Feedlot

Klopfenstein TJ, GE Erickson, RA Moxley, DR Smith and S Hinkley. Montana State University, 07-15-04/07-14-05, $122,378

Minimum Inhibitory Concentration Susceptibility Testing of Swine Isolates of *Brachyspira pilosicoli*

Duhamel GE. 2004. Novartis Animal Health United States, Inc, $11,500

Molecular Characterization and Pathogenesis of *Francisella tularensis*

Duhamel GE. 2002-2004. University of Nebraska-Lincoln and University of Nebraska Medical Center, Research Collaboration Grant Program, $218,000

Molecular Characterization and Pathogenesis of *Francisella tularensis*

Meagher M, S Hinrich, P Fey, T Jerrell, P Iwen, A Benson, RG Barletta, JD Cirillo, GE Duhamel and M Griep. UNMC-UNL Interdisciplinary Research, 09-01-02/06-30-03, $100,000

Mouse Model for Studying Candidiasis

Duhamel GE and KW Nickerson. 2004-2005. Interdisciplinary Research, UNL Research Council, $20,000

Mycobacterial Drug Resistance

Barletta RG. Research in Microbiology Immunology and Infectious Diseases Foundation, Medical Research Institute of San Francisco at California Pacific Medical Center, Kuzell Institute for Arthritis and Infectious Diseases, 10-95/6-04, $4,500

National Animal Health Laboratory Network-Nebraska (NAHLN-NE)

Steffen DJ, CL Kelling, DD Griffin and A Wohlers. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service, 09-01-06/08-31-07, $50,000

Optimizing Collection and Transportation of *E. coli*

Smith DR, JT Gray, LL Hungerford, TJ Klopfenstein, RA Moxley and CT Milton. Nebraska Beef Council, 04-00/04-01, $22,940

Pathogenesis of Porcine Circovirus

Brodersen BW and RA Hesse. 2003. Collaborative study with Intervet, $1,500

Plant Endophytic Bacteria

Vidaver AK and RG Barletta. Kamterter, Inc, 12-01-01/11-30-02, $36,000

Production and Characterization of Group A Bovine Rotavirus Challenge Material in Gnotobiotic Calves

Duhamel GE. 2004. Novartis Animal Vaccines, Inc, $6,000

Production of Mouse x Porcine Neutralizing Antibodies Anti-Porcine Reproductive and Respiratory Syndrome Virus

Osorio FA. PIC USA, Sygen International, 02-02/01-03, $74,755

Production and Characterization of Bovine Group A Rotavirus and Coronavirus Challenge Material in Gnotobiotic Calves

Duhamel GE. 1998-2002. Grand Laboratories, Inc, $65,314

Protective Immunity Against PRRSV Obtained by Passive Administration of Antibodies: Optimization of the Conditions

Osorio FA. National Pork Producers Council, 06-02/12-04, $25,000

Protein-thiol Mixed Disulfides in Cataractogenesis

Lou MF. National Institute of Health (NIH), biochemical mechanism of cataract formation study, 07-01-03/06-30-07, $1,794,300

Protein-thiol Mixed Disulfides in Cataractogenesis

Lou MF. National Institute of Health (NIH), biochemical mechanism of cataract formation study, 2-1-99/1-31-03, $1,286,072

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines

Osorio FA and AK Pattnaik. National Pork Board, 10-01-05/09-30-06, request for extension pending, $150,000

Removal of Starch from the Diet

Klopfenstein TJ, RA Moxley, CT Milton, DR Smith, LL Hungerford and JT Gray. Nebraska Beef Council, 04-00/04-01, $33,400

Replication of Genomic Analogs of HCV in Transfected Cells

Pattnaik AK. Eli Lilly and Company, 01-15-01/01-14-02, $74,500/year

Role of Macrophages in the Pathogenesis of Porcine Colonic Spirochetosis

Duhamel GE and JD Cirillo. 2000-2004. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Animal Health and Well-Being, $240,000

Role of PRRSV-Specific Antibodies in Protective Immunity Against Porcine Reproductive and Respiratory Syndrome Virus Infections

Osorio FA. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Sustaining Animal Health and Well-Being, project #2002-35204-12459, 10-02/09-04, $200,000

Role of *E. coli* Heat-labile Enterotoxin-I in Diarrhea and Septicemia in Swine

Moxley RA and RG Barletta. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Sustaining Animal Health and Well Being, 11-01-98/10-31-03, $140,000

Scrapie Program

Brodersen BW. 2002. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), contract award for support at $15/testing commitment for 5,000 and agreement for up to 10,000 tests/year. Estimated gross revenues $75,000-150,000

Surveillance for Chronic Wasting Disease in Nebraska Deer

Steffen DJ and BW Brodersen. Nebraska Game and Parks Commission, 02-24-06/08-31-06, $170,000

Targeting *M. tuberculosis* Alanine Ligase for Drug Design

Barletta RG. National Institute of Health (NIH), 08-01-02/07-31-04, $145,000

The Effect of Porcine Reproductive and Respiratory Syndrome Virus on the Immune System During Acute and Persistent Infections

Osorio FA. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Sustaining Animal Health and Well-Being, project #99-35204-8041, 09-99/10-02, $150,000

Training Junior Faculty Members and Establish a Research Center for Redox Biology Center

Banerjee R and MF Lou. 2002-2007. National Institute of Health (NIH), Redox Biology Center Cobra Grant, 10M

Transmission of Bovine Viral Diarrhea Virus via Semen from Bulls with Persistent Testicular Infection

Givens MD, AM Heath, DA Stringfellow, KV Brock, TD Braden and BW Brodersen. 2003. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), $212,534

Up-Regulation of K+Channels in the Remodeled Ventricle

Rozanski GJ and MF Lou. National Institute of Health (NIH), Subcontract/University of Nebraska Medical Center (UNMC) for the control mechanism of redox buffer glutathione on arrhythmias, 10-1-00/9-30-04, $1,081,579

Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virus for the Study of PRRSV Pathogenesis and *In Vivo* Tropism

Osorio FA and AK Pattnaik. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), 09-01-08/31-31-07, $129,600

Use of Beneficial Plant-microbe Interactions to Enhance Biomass Yield, and Economic Value and Sustainability of Agricultural Products

Vidaver AK, RG Barletta, PH Blum and TJ Klopfenstein. Strategic Research Cluster Grant, University of Nebraska-Lincoln, 08-01-02/06-30-03, $10,000

Vaccination as an *E. coli* O157:H7 Intervention Strategy - 2004 phase II Study

Moxley RA, TJ Klopfenstein, DR Smith, GE Erickson and S Hinkley. Bioniche Life Sciences, Inc, 05-19-04/12-31-04, $152,790

Vaccination as *E. coli* O157:H7 Intervention Strategy — phase II

Klopfenstein TJ. DR Smith, RA Moxley, GE Erickson and S Hinkley. Bioniche Animal Health, 05-01-03/12-31-03, $25,000

Vaccination as an *E. coli* O157:H7 Intervention Strategy -Phase II

Klopfenstein TJ, DR Smith, RA Moxley, GE Erickson and S Hinkley. Nebraska Beef Council, 01-2003/09-2003 $50,000

Validation of Test Methods Needed to Evaluate Intervention Strategies for *Escherichia coli* O157:H7 Intestinal Colonization and Fecal Shedding in Feedlot Cattle

Moxley RA, S Hinkley, DR Smith, GE Erickson and TJ Klopfenstein. Nebraska Beef Council, 04-01-04/05-01-05, $45,080

Viral Pathogens that Contribute to Respiratory Disease Complex in Cattle: Epidemiology of Persistent BVDV Infections

Brodersen BW. United States Department of Agriculture (USDA), Agriculture Research Service (ARS) Extramural Agreement, $25,000

Viral Pathogenesis

Jones, CJ. National Institute of Health (NIH), Centers of Biomedical Research Excellence (COBRE), $83,000/year in direct costs from grant this year, 10-00/10-05, $10,400,000

Vitamin-Dependent Modifications of Histones

Zempleni J and MF Lou. 2003-2007. National Institute of Health (NIH), the function of vitamins in cell proliferation study, $1,087,586

VSV RNA Transcription and Replication

Pattnaik AK. National Institutes of Health (NIH), 03-01-01/02-28-07, $1,495,688

West Nile Virus Testing

Steffen, DJ. Nebraska Health and Human Services, WBS#26-6239-0132-001, 05-16-05/04-30-06, $18,000

West Nile Virus Testing

Steffen DJ. 2005-2006. Nebraska Health and Human Services, WBS#26-6239-0132-001, additional $15,000

West Nile Surveillence

Steffen DJ and Clayton Kelling. Nebraska Department of Health Regulation and Licence, 06-09-06/06-09-07, $28,000

Whole-Genome Sequencing and Analysis of *Lawsonia intracellularis*

Duhamel GE and V Kapur. 2000-2003. United States Department of Agriculture (USDA), Initiative for Future Agriculture and Food Systems, $997,962

INDUSTRY GRANTS

Efficacy of Carbadox^{R} for the Control and Treatment of Porcine Proliferative Enteropathy (PPE) Associated with a Natural Infection of Lawsonia Intracellularis

Doster AR, S Hinkley and HE Cerny. 2006. Philbro Animal Health, $14,841

Genetic Resistance to Porcine Reproductive and Respiratory Syndrome Virus (PRRSV)

Johnson R, FA Osorio and AR Doster. 2006. Nebraska Pork Producers Association, $25,000

GENERATED REVENUES

Income from Sale of Monoclonal Antibodies

Duhamel GE. 1998-2003. University of Nebraska-Lincoln, Veterinary Diagnostic Laboratories, $498

INTRAMURAL GRANTS

TRAVEL GRANTS

Annual Meeting of the American College of Veterinary Pathologists

Duhamel GE. 2005. IANR Research Travel Fund, Boston, MA, $500

Annual Conference of Association of Research for Vision and Ophthalmology

Lou MF and MR Fernando. 2006. University of Nebraska-Lincoln, Agriculture Research Divsision (ARD), $500

Biannual International Congress of Eye Research (ICER) Conference

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UCARE PROGRAM GRANTS

Marjorie F. Lou

The Age Effect on the Gene Expression of Thioredoxin and Thioredoxin Binding Proteins in the Lens

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Relative Importance of Heat-Labile Enterotoxin in the Causation of Severe Diarrheal Disease in the Gnotobiotic Piglet Model by a Strain of *Escherichia coli* that Produces Multiple Enterotoxins

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Role of the Hypervariable Hinge Region of the Phosphoprotein P of Vesicular Stomatitis Virus in Viral RNA Synthesis and Assembly of Infectious Virus Particles

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Feng Z and RG Barletta. 2003. Antimicrobial Agents and Chemotherapy, 47:283-291, ARD Journal Series #13729

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Src Regulates the Activity of the Mammalian Formin Protein FHOD1

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***Staphylococcus epidermidis* Polysaccharide Intercellular Adhesin Production Significantly Increases During Tricarboxylic Acid Cycle Stress**

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GA Somerville, MS Chaussee, CI Morgan, JR Fitzgerald, DW Dorward, LJ Reitzer and JM Musser. 2002. Infection and Immunity, 70:6373-6382

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Use of a Modified Live Vaccine to Prevent Persistent Testicular Infection with Bovine Viral Diarrhea Virus

Givens MD, Riddell KP, Zhang Y, Galika PK, Stringfellow DA, Brodersen BW, Jackson JA, Ellsworth MA, Ficken MD, Carson RL, Wenzel JG and Marley MS. 2006. Veterinary Therapeutics, 7(3):305-318

Very Low Ethanol Concentrations Affect Viability and Growth Recovery in Post-Stationary *Staphylococcus aureus* Populations

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Vesicular Stomatitis Virus Infection and Neuropathogenesis in the Murine Model are Associated with Apoptosis

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Visualization of Intracellular Transport of Vesicular Stomatitis Virus Nucleocapsids in Living Cells

Das SC, Nayak D, Zhou Y and Pattnaik AK. 2006. Journal of Virology, 80:6368-6377

West Nile Virus Infection in Reindeer (*Rangifer tarandus*)

Palmer MV, WC Stoffregen and DG Rogers, et al. 2004. Journal of Veterinary Diagnostic Investigation, 16:219-222, ARD Journal Series #14162

Department of Veterinary and Biomedical Sciences
Non-refereed Publications and Research Reports, 2006

Characterization of *Brachyspira* and *Helicobacter* Associated with the Colonic Epithelium of North American Opossums

Chia SY, Stryker CJ and Duhamel GE. 2006. Undergraduate Research Conference, University of Nebraska-Lincoln, April 6, #116 poster

Co-Segregation of Cytolethal Distending Toxin B (*cdtB*) Variant III Gene and Cytotoxic Necrotizing Factor I (*cnf-1*) Gene Among Feline and Canine *Escherichia coli* sero Group O6

Jinadasa RN, DebRoy C and Duhamel GE. 2006. 86th Annual Meeting Conference Research Workers in Animal Diseases, Chicago, Illinois, December 3-5, P15, poster presentation

Immunoinhibitory Activity of Helicobacter Hepaticus Cytolethal Distending Toxin Against Lymphocytes from Inbred Strains of Mice

Jinadasa RN, Schmaltz RJ, Liyanage NM, Dassanayake RP, Weber JS and Duhamel GE. 2006. 3rd Annual Meeting of the University of Nebraska-Lincoln Microbiology Initiative, Beadle Center, Lincoln, Nebraska, August 14, poster presentation

Lameness in Feedlot Cattle

Griffin, DD. 2006. The American Association of Bovine Practitioners (AABP) Proceedings, Minneapolis, MN

Large-Scale Clinical Trial to Evaluate an Experimental *Escherichia coli* Vaccine

Peterson RE, Smith DR, Moxley RA, Klopfenstein TJ, Hinkley S and Erickson GE. 2006. Nebraska Beef Report, University of Nebraska Cooperative Extension, MP 88A, pgs 70-71

Large-Scale Clinical Trial to Evaluate an Experimental *Escherichia coli* O157:H7 Vaccine

Peterson RE, DR Smith, RA Moxley, TJ Klopfenstein, S Hinkley and GE Erickson. 2006. Nebraska Beef Report, Agricultural Research Division, University of Nebraska Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, MP88-A, pgs 70-71

Role of Chlamydospores in a Mouse Model of Disseminated Candidiasis

Navarathna DHMLP, Kebaara B, Duhamel GE and Nickerson KW. 2006. 3rd Annual Meeting of the University of Nebraska-Lincoln Microbiology Initiative, Beadle Center, Lincoln, Nebraska, August 14, oral presentation

Vaccination for *Escherichia coli* O157:H7 in Market Ready Feedlot Cattle

Peterson RE, Smith DR, Moxley RA, Klopfenstein TJ, Hinkley S and Erickson GE. 2006. Nebraska Beef Report, University of Nebraska Cooperative Extension, MP 88A, pgs 68-69

Department of Veterianry and Biomedical Sciences Books and Book Chapters in 2006

Antibiotic Selection and Use in Beef Feedlots

Griffin DD. 2006. Howard's Current Veterinary Therapy of Food Animals

Construction of a Full-Length cDNA Infectious Clone of a European-Like Type 1 PRRSV Isolated in the US

Fang Y, Faaberg KS, Rowland R, Christopher-Hennings J, Pattnaik AK, Osorio FA and Nelson EA. 2006. *In*: The Nidoviruses: The Control of SARS and Other Nidovirus Diseases, Edited by S Perlman and K Holmes, pp 605-608

Managing Quality Assurance in the Beef Cow Calf Herd

Griffin DD. 2006. Howard's Current Veterinary Therapy of Food Animals

***Mycobacterium bovis* Infection in Animals and Humans**

Thoen CO and RG Barletta. 2006. *In:* Chapter 4: Pathogenesis, pp. 18-33; CO Thoen, JH Steele and MJ Gilsdorf (eds.), Second Edition, Blackwell Publishing

Neonatal Calf Enteric Disease Vaccines

Duhamel GE. 2006. *In*: Large Animal Internal Medicine, 4th ed., Smith BP (ed), Mosby, Inc, St Louis, Missouri, in press

Oxidation Damage on Ocular Tissues

Banerjee R, DF Becker, M Dickman, VN Gladyshev, MF Lou and S Ragsdale. 2006. Redox Biology Text book, Glutathione system

Oxidative Stress and the Host-Pathogen Interaction

Somerville GA. 2006. Redox Biology Book, submitted

Porcine Colonic Spirochetosis/Intestinal Spirochetosis

Hampson DJ and Duhamel GE. 2006. *In*: Diseases of Swine, 9th ed. Straw BE, D'Allaire S, Mengeling WL and Taylor DJ (eds), Iowa State University Press, Ames, Iowa, pp 755-767

Porcine Reproductive and Respiratory Syndrome Virus

Zimmerman J, Benfield D, Murtaugh M, Osorio F, Stevenson G and Torremorell M. 2006. In: Diseases of Swine, 9th edition. Straw BE, D'Allaire S, Zimmerman J and Taylor DJ, eds., Blackwell Publishing Company, Ames, Iowa

Department of Veterinary and Biomedical Sciences
Other Publications-Public Press or Newsletters, 2006

•*RG Barletta*

Búsqueda de Nuevas Alternativas Terapéuticas para el Control de la Tuberculosis (Search for New Therapeutic Alternatives for the Control of Tuberculosis)
Realpe-Quintero T, Chacon O, Barletta RG and Robledo Restrepo JA. 2006. Universitas Científica, Universidad Pontificia Bolivariana, Medellín, Colombia

•*A Wohlers*

BVD The Profit Robber, Scottsbluff Star-Herald, 2006
Value in Pregnancy testing Cattle, Scottsbluff Star-Herald, 2006
Health Aspects of the Early weaned Calf, Scottsbluff Star-Herald, 2006
Our Children and Calf Scours, Scottsbluff Star-Herald, 2006
Biosecurity in Beef Production, Scottsbluff Star-Herald, 2006
Predicting Disease in Cattle, Scottsbluff Star-Herald, 2006
Scours is a Modern Disease, Scottsbluff Star-Herald, 2006
Control Flies Before They Control Your Cattle, 2006
Livestock Carcass Disposal, Scottsbluff star-Herald, 2006
The Art of Beef Production, Star-Herald, 2006

Department of Veterinary and Biomedical Sciences Extension Publications, 2006

NebFact: Blue-Green Algae Poisoning of Animals for Pet and Animal Owners
Carlson, MP and DR Smith. 2006. In progress

NebGuide: Blue-Green Algae Poisoning of Animals
Carlson, MP and DR Smith. 2006. In progress

Your Role in Preventing BSE
Smith, DR. 2006. NDA Bovine Spongiform Encephalopathy Feed Regulations pamphlet

Department of Veterinary and Biomedical Sciences Computer Software, Other Publications or Media Developed in 2006

•*Bruce W. Brodersen*

- •List owner for NEBVET-L
- •List owner for NEB-SWINEVETS

•*Alan R. Doster*

- •Assembled 135 kodachromes photos and digital images of various wildlife diseases with descriptions for the Nebraska Game and Parks Commission (NGPC)

•*Zhou You (Joe)*

- •High resolution digital imaging system for transmission electron microscope

Department of Veterinary and Biomedical Sciences Presentations for 2006

A Polymorphic Glucocorticoid Receptor in a Mouse Population May Explain Inherited Altered Stress Response and Increased Anxiety-Type Behaviors

Zhou Y, D Xu, A Buehner, J Xu, T Lambert, C Nekl and MK Nielsen. 2006. The 36th Annual Meeting of the Society for Neurosciences, #59/17V1

A Large-Scale Clinical Trial Evaluating an *Escherichia coli* O157:H7 Type III Secreted Protein Vaccine for Cattle in Commercial Feedlot Systems

Smith DR, RA Moxley, RE Peterson, TJ Klopfenstein, GE Erickson, S Hinkley, G Bretschneider and EM Berberov. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster #P12.1.04 with published abstract

A New Recessive X-linked Mutant, Belly Hair Loss (bhl) with Strain-Specific Differences in Phenotype

Weber JS and Steffen DJ. 2006. 19th International Mouse Genome Conference, Strasbourg, France

A Case of Suspected Anatoxin Toxicosis in a Dog

Carlson MP, BW Brodersen, DD Snow and ML Pauli. 2006. American Association of Veterinary Laboratory Diagnosticians (AAVLD), 49th Annual Conference, Minneapolis, MN

A Large-Scale Clinical Trial Evaluating an *Escherichia coli* O157:H7 Type III Secreted Protein Vaccine for Cattle in Commercial Feedlot Systems

Smith DR, Moxley RA, Peterson RE, Klopfenstein TJ, Erickson GE, Hinkley S, Bretschneider G and Berberov EM. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster presentation #P12.1.04 with published abstract

A Large Clinical Trial of a Cattle Vaccine Against Type III Secreted Proteins of *E. coli* O157:H7

Smith DR, Peterson RE, Moxley RA, Klopfenstein TJ, Erickson GE and Hinkley S. 2006. International Symposium on Veterinary Epidemiology and Economics (ISVEE XI), Cairns, Australia, oral presentation with published abstract

Adding Value to Feeder Cattle

Wohlers A. 2006. Nebraska Cattlemen, Alliance, NE, 55 producers

Annual Symposium of the Center for Infectious Disease Research and Vaccinology

Pattnaik AK. 2006. South Dakota State University, Brookings, SD

Asia Pacific Congress
Pattnaik AK. 2006. Medical Virology, New Delhi, India

Antibiotic Selection and Use
Griffin DD. 2006. Nebraska Veterinary Medical Association, Omaha, NE

Antibiotic Selection and Use Series
Griffin DD. 2006. Pfizer Animal Health, Roanoke, VA

Antibiotic Selection and Use
Griffin DD. 2006. Bayer Animal Health, Kansas City, KS

Antibiotic Selection and Use Series
Griffin DD. 2006. Pfizer Animal Health, Buffalo, NY

Applying Population Dynamics to Control and Prevention of Neonatal Diarrhea
Smith DR. 2006. Indiana Veterinary Medical Association Annual Convention, Indianapolis, IN, invited oral presentation and paper

Applying Biosecurity and Biocontainment to Control Disease in Cattle Populations: *E. coli* O157:H7, Johne's Disease, and Calf Scours
Smith DR. 2006. Beef Industry Research Exchange, North Platte, NE

Applying Population Dynamics to Diagnosis and Control of Johne's Disease
Smith DR. 2006. Indiana Veterinary Medical Association Annual Convention, Indianapolis, IN, invited oral presentation and paper

Beef Cattle Production Management and Applied Biosecurity Workshop
Griffin DD. 2006. Tennessee Veterinary Medical Association, Franklin, TN

Beef Cattle Production Management and Applied Biosecurity Workshop
Griffin DD. 2006. Madison, WI

Beef Cattle Applied Biosecurity Workshop
Griffin DD. 2006. Texas A&M University, College Station, TX

Biosecurity Workshop
Griffin DD. 2006. American Association of Bovine Practitioners (AABP), Minneapolis, MN

Bovine Spongiform Encephalopathy: Tests and Control
Smith DR. 2006. Nebraska Beef Feedlot Roundtable, Columbus, Lexington and Gering, NE

Bovine Spongiform Encephalopathy: Tests and Control

Moxley RA and Smith DR. 2006. Presentation to Japanese Agricultural Students, University of Nebraska-Lincoln, Department of Animal Science

BQA and Production Management

Griffin DD. 2006. Missouri Veterinary Medical Association, Branson, MO

Beef Cattle Production Management and Applied Biosecurity Workshop

Griffin DD. 2006. Hot Springs, AR

Breeding Soundness Examination of Bulls

GP Rupp. 2006. Nebraska Veterinary Medical Association, Hastings, Nebraska

BVDV Control Plans: Components, Setting and Achieving Goals

Smith DR. 2006. NCBA Pre-Conference BVDV Symposium, Denver, CO, invited oral presentation and paper

Calf Losses

Rupp GP. 2006. Four State Beef Conference

Characterization of the Influence of N^{PRO} on the Virulence of Noncytopathic Bovine Viral Diarrhea Virus in Calves

Henningson JN, Steffen DJ, Topliff CL, Donis RO and Kelling CL. 2006. Conference of Research Workers in Animal Disease Proceedings

Characterization of *Brachyspira* and *Helicobacter* Associated with the Colonic Epithelium of North American Opossums

Chia SY, Stryker CJ and Duhamel GE. 2006. Undergraduate Research Conference, University of Nebraska-Lincoln, #116 Poster Presentation

Characterization of Protection Against Replication of Bovine Viral Diarrhea Virus Type 2 in Calves with a Modified-Live Noncytopathic Bovine Viral Diarrhea Virus Type 1 Vaccine

Hunsaker BD, Steffen DJ, Topliff CL, Eskridge KM and Kelling CL. 2006. Conference of Research Workers in Animal Disease Proceedings

Co-Segregation of Cytolethal Distending Toxin B (*cdtB*) Variant III Gene and Cytotoxic Necrotizing Factor I (*cnf-1*) Gene Among Feline and Canine *Escherichia coli* Serogroup O6

Jinadasa RN, DebRoy C and Duhamel GE. 2006. 86th Annual Meeting Conference Research Workers in Animal Diseases, Chicago, Illinois, poster presentation

Comparative Analyses Of Lesions and Viral Antigen Distribution in Alpacas and Calves Persistently Infected with Bovine Viral Diarrhea Virus Type 1b

JN Henningson, CL Topliff, DJ Steffen, BW Brodersen, D Bedenice, RJ Callan, WE Davis, GP Rupp, DR Smith and CL Kelling. 2006. American College of Veterinary Pathologist Annual Meeting, Phoenix AZ, presentation of refereed poster and abstract

Control of Platelet-Derived Growth Factor (PDGF) Induced Reactive Oxygen Species (ROS) in the Lens Epithelial Cells

Lou MF and Chen C-W. 2006. 6th ACRC Conference, Beijing, China

Controlling *Escherichia coli* O157:H7 in Feedlot Cattle: A Population Approach

Smith DR. 2006. Seminar: Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

Current Status of BVDV in the United States: BVDV Infections, Diagnostic Technologies, and Disease Control Opportunities

Steffen, DJ. 2006. Schering Plough Animal Health Strategic Meeting, invited presentation

Current Improvements Leading to a New Generation of PRRSV Vaccines Beyond Year 2006

Osorio FA. 2006. Presented at the SYVA Swine Technical Days Tenerife, Spain

Development and Preliminary Characterization of a Candidate Mutant Vaccine for *Mycobacterium avium subsp. paratuberculosis* (Map)

KT Park, MJ Hamilton, AJ Allen, KS Seo, J Bannantine, RG Barletta and WC Davis. 2006. Conference of Research Workers in Animal Disease, Chicago, Illinois

Development of New Generation PRRSV Vaccines

Osorio FA. 2006. Presentation at the Zhejiang University-Iowa State University Ensminger International School on Swine Diseases, Hangzhou, China

Diagnosis of Emerging Congenital Diseases in Calves

Steffen, DJ. 2006. Nebraska Veterinary Medical Association Summer Meeting, invited presentation with abstract

Diagnostic Approaches to Congenital Defects: Congenital Defects Genetic and Environmental

Steffen DJ. 2006. The Iowa Veterinary Medical Association Annual Meeting, invited with funding to present in the Bovine Session

Diagnostic Approaches to Congenital Defects and Constructing a Control Program

Steffen DJ. 2006. American Society for Theriogenology Annual Meeting, Charleston, SC, invited with funding, presentation on currently important diseases and structuring control programs

Diseases of Swine

Doster AR. 2006. American Feed and Grain Association, University of Nebraska-Lincoln, Lincoln, NE, oral presentation

Diseases of Deer

Doster AR. 2006. Nebraska Cooperative Extension Program, Nebraska Wild Game Meat Safety Program, Adams County, Hastings, NE, oral presentation

Does Vaccinating Cattle Against Type III Secreted Proteins of *Escherichia coli* O157:H7 Prevent Colonization?

Smith DR, RE Peterson, RA Moxley, TJ Klopfenstein, GE Erickson and S Hinkley. 2006. International Symposium on Veterinary Epidemiology and Economics (ISVEE XI), Cairns, Australia, Poster presentation with published abstract

Ear Notch Extract PCR - A Cost Effective Approach for Screening Feedlot Cattle

Steffen, DJ. 2006. BVD Control: The Future is Now, Diagnostic and Surveillance, United States Department of Agriculture (USDA), National Animal Disease Center, Agriculture Research Service, Refereed presentation with abstracts published in proceedings

Ear Notch Extract PCR - A Cost Effective Approach for Diagnosing PI's in feedlots

Steffen, DJ. 2006. Conference of Research Workers on Animal Diseases Special Semiannual BVDV workshop

Effect of Regional Vaccination Within the Feedyard on *Escherichia coli* O157:H7 Rectal Colonization, Fecal Shedding, and Hide Contamination

Smith DR, RA Moxley, TJ Klopfenstein and GE Erickson. 2006. Conference of Research Workers in Animal Diseases, Chicago, Illinois, oral presentation with published abstract #110

Effect of *Lactobacillus acidophilus* Strain NP51 on *Escherichia coli* O157:H7 Fecal Shedding and Finishing Performance in Beef Feedlot Cattle

Moxley RA, DR Smith, TJ Klopfenstein, GE Erickson, JD Folmer, RE Peterson and S Hinkley. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster #P11.2.05 with published abstract

Effect of Vaccination Within the Feedyard on *Escherichia coli* O157:H7 Colonization, Fecal Shedding, and Hide Contamination

Moxley RA, DR Smith, TJ Klopfenstein and GE Erickson. 2006. Cattle Industry Summer Conference, Beef Safety Committee, Reno, Nevada, oral presentation

Effect of Vaccinating Against Type III Secreted Proteins of *E. coli* O157:H7 on its Pre- and Post-Harvest Occurrence on Cattle Hides

Peterson RE, DR Smith, TJ Klopfenstein and GE Erickson. 2006. Joint Meeting of the American Dairy Science Association (ADSA) and American Society of Animal Science (ASAS) Minneapolis, Minnesota, oral presentation and published abstract #269, Journal of Animal Science, Vol 84(Suppl 1); Journal of Dairy Science, Vol 89(Suppl 1):250

Effect of Regional Vaccination within the Feedyard on *Escherichia coli* O157:H7 Rectal Colonization, Fecal Shedding, and Hide Contamination

Smith DR, Moxley RA, Klopfenstein TJ and Erickson G. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, oral presentation with published abstract

Effect of Regional Vaccination within the Feedyard on *Escherichia coli* O157:H7 Rectal Colonization, Fecal Shedding, and Hide Contamination

Smith DR, Moxley RA, Klopfenstein TJ and Erickson GE. 2006. Conference of Research Workers in Animal Diseases, Chicago, Illinois, Oral presentation with published abstract #110

Effect of *Lactobacillus acidophilus* Srain NP51 on *Escherichia coli* O157:H7 Fecal Shedding and Finishing Performance in Beef Feedlot Cattle

Moxley RA, Smith DR, Klopfenstein TJ, Erickson GE, Folmer JD, Peterson RE and Hinkley S. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster presentation #P11.2.05 with published abstract

Effect of Dosage Number of an *Escherichia coli* O157:H7 Type III Secreted Protein Vaccine on Fecal Shedding and Herd Immunity in Feedlot Cattle

Smith DR, Moxley RA, Peterson RE, Klopfenstein TJ, Erickson GE, Hinkley S and Rogan D. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster presentation #P12.1.05 with published abstract

Effect of Vaccination Within the Feedyard on *Escherichia coli* O157:H7 Colonization, Fecal Shedding, and Hide Contamination

Moxley RA, Smith DR, Klopfenstein TJ and Erickson GE. 2006. NCBA Cattle Industry Summer Conference, Beef Safety Committee, Reno, Nevada, oral presentation

Effect of a Type III Secreted Protein Vaccine on *Escherichia coli* O157:H7 Fecal Shedding and Rectal Colonization of Feedlot Cattle

Moxley RA, Smith DR, Klopfenstein TJ, Erickson GE, Peterson RE, Hinkley S, Bretschneider G, Berberov EM and Rogan D. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster presentation #P11.2.06 with published abstract

Effect of Vaccinating Against Type III Secreted Proteins of *E. coli* O157:H7 on its Pre- and Post-Harvest Occurrence on Cattle Hides

Peterson RE, Smith DR, Klopfenstein TJ and Erickson GE. 2006. Joint Meeting of the American Dairy Science Association (ADSA) and American Society of Animal Science (ASAS) Minneapolis, MN, oral presentation with published abstract #269, Journal of Animal Science, Vol 84(Suppl 1); Journal of Dairy Science, Vol 89(Suppl 1):250

Effect of a Type III Secreted Protein Vaccine on *Escherichia coli* O157:H7 Fecal Shedding and Rectal Colonization of Feedlot Cattle

Moxley RA, DR Smith, TJ Klopfenstein, GE Erickson, RE Peterson, S Hinkley, G Bretschneider, EM Berberov and D Rogan. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster #P11.2.06 with published abstract

Escherichia coli O157:H7

Moxley RA. 2006. Presentation to Japanese Agricultural Students, University of Nebraska-Lincoln, Department of Animal Science

Gram-Positive Pathogenesis Meeting

Somerville, GA. 2006. Omaha, NE, students presented posters

Handling Drugs Safely

Wohlers A. 2006. Riverside Zoo Workshop, Scottsbluff, NE, 10 zoo personnel

Hazards of Animal Disease

Wohler A. 2006. Farm and Ranch Conference, Scottsbluff, NE, 65 participants

Health Issues Related to Livestock Production

Smith DR. 2006. Annual Meeting of the Nebraska Holstein Association, York, NE

IL-1β Mediated Activation of Bovine Monocytes Promotes Phagosome-Lysosome Fusion and Inhibits Intracellular Survival of _M. paratuberculosis_

SR Woo, AP Hart, CJ Kuckleburg, RG Barletta and CJ Czuprynski. 2006. American Society for Microbiology, 106th General Meeting, Orlando, Florida

Immunoinhibitory Activity of _Helicobacter hepaticus_ Cytolethal Distending Toxin Against Lymphocytes from Inbred Strains of Mice

Jinadasa RN, Schmaltz RJ, Liyanage NM, Dassanayake RP, Weber JS and Duhamel GE. 2006. 3rd Annual Meeting of the University of Nebraska-Lincoln, Microbiology Initiative, Beadle Center, Lincoln, Nebraska, poster presentation

Influence of Bovine Respiratory Syncytial Virus F Protein N-Glycosylation on Host Cell Fusion

Mori Y, Klink HA, Topliff CL and Kelling CL. 2006. Midwest Biomedical Student Research Forum

Influence of Mutations in the 5' Untranslated Region Internal Ribosomal Entry Site and the N^{PRO} Coding Region on _in vivo_ Translational Efficiencies of Bovine Viral Diarrhea Virus Genotype 2 Isolates

Topliff CL, Chon SK, Donis RO, Eskridge KM and Kelling CL. 2006. Conference of Research Workers in Animal Diseases Proceedings

Innate Immunity and Staphylococcal Pathogenesis

Somverville, GA. 2006. Morningside College in Iowa

Intervention Strategies to Reduce _Escherichia coli_ O157:H7 in Beef Feedyards

Smith DR, Moxley RA, Klopfenstein TJ and Erickson GE. 2006. Project Director's Meeting, USDA National Integrated Food Safety Initiative, Washington DC, oral presentation with abstract

Is Vaccination Effective for the Control of *Escherichia coli* O157:H7 in Feedlot Cattle?
Smith DR. 2006. Smithfield Beef Group, Green Bay, WI

Making Decisions About Bovine Virus Diarrhea
Wohlers A. 2006. IRM Pen of 5 Winter Meeting, Harrisburg, NE, 80 producers

***Mitochondrial Thioltransferase* (glutaredoxin 2) has GSH-Dependent and Thioredoxin Reductase-Dependent Peroxidase Activities *in vitro* and in Lens Epithelial Cells**
Fernando MR, Lechner JM, Löfgren S, Gladyshev VN and Lou MF. 2006. Presented at the Annual Retreat of the Nebraska Redox Biology Center, Nebraska City, NE

Necropsy and Laboratory Practices of US Diagnostic Laboratories
Steffen DJ. 2006. Animal Sceinces Department, International Study tour 30 Japanese students, International Invitation, invited presentation

Negative-Strand RNA Viruses
AK Pattanik. 2006. International Conference, Salamanca, Spain

Network on Antimicrobial Resistance in *Staphylococcus aureus* (NARSA)
Somerville, GA. 2006. Meeting attendee, Richmond, VA

ORF5 and ORF2 are the Main Structural Genes Carrying Determinants of Virulence of PRRSV
BJ Kwon, IH Ansari, AK Pattnaik and FA Osorio. 2006. Presentation at the 3rd International Symposium on PRRSV and CRWAD Meeting, Chicago Illinois, Abstract #50

Serological Marker Candidates Identified on Structural and Non-Structural Proteins of PRRSV
M de Lima, AK Pattnaik, EF Flores and FA Osorio. 2006. Presentation at the 3rd International Symposium on PRRSV and CRWAD Meeting, Chicago Illinois, Abstract #51

Persistent Testicular Infection with Bovine Viral Diarrhea Virus Due to Field Exposure to Persistently Infected Heifers
Givens MD, Riddell KP, Abrams MS, Walz PH, Zhang Y, Brodersen BW, Carson RL and Stringfellow DA. 2006. Annual Meeting of the American Association of Veterinary Laboratory Diagnosticians

Pointers on Shipping Specimens to the Veterinary Diagnostic Laboratory
Doster AR. 2006. Veterinary Technician Continuing Education Seminar, Lincoln, NE, oral presentation

Pooled PCR on Skin Extract as a Strategy for BVDV Screening
Steffen DJ, Brodersen BW, Galeota JA, Smith DR, Rupp GA and Kelling CL. 2006. AAVLD Annual Meeting, Minneapolis MN

Porcine Enterovirus Infection in Two Groups of Feeder Pigs

Henningson J, P Graham, K Schumacher and AR Doster. 2006. North Central Conference of Laboratory Diagnosticians, Lincoln, NE, presentation by Dr. Jamie Henningson

Predicting Disease in Cattle

Wohlers A. 2006. IRM Pen of 5 wrap up, Chadron, NE, 60 producers

Prevention of Neonatal Calf Diarrhea with the Sandhills Calving System

Smith DR. 2006. Texas A&M University Annual Food Animal Conference, College Station, TX, invited oral presentation with proceedings

Protecting Ourselves From Dangerous Dog Attacks

Wohlers A. 2006. Panhandle Mental Fall Regional Conference, Scottsbluff, NE, 62 home health providers

Protective Immunity and Vaccines Against PRRSV

Osorio FA. 2006. Presentation at the SYVA Swine Technical Days, Marbella, Spain

PRRSV Immunological Issues

Osorio FA. 2006. Presentation at Modern Veterinary Products, Omaha, Nebraska

PRRSV Protective Immunity and Vaccines

Osorio FA. 2006. Update 2006 and Beyond, presented at the First Annual Meeting of the Canadian Network on Swine Infectious Diseases (SIDNet) University of Montreal, School of Veterinary Medicine, Saint-Hyacinthe, Quebec, Canada

PRRSV Vaccines

Osorio FA. 2006. Presentation at the PRRSV and Circovirus Days, Universidad Autonoma de Barcelona, Bellaterra, Catalanuya, Spain

Quality Assurance Management

Griffin DD. 2006. Pennsylvania Beef Council, Harrisburg, PA

Reduced Intestinal Colonization of Adult Beef Cattle by *Escherichia coli* O157:H7 *tir* Deletion and Nalidixic Acid-Resistant Mutants Lacking Flagellar Expression

Bretschneider G, EM Berberov and RA Moxley. 2006. 6th International Symposium on Shiga Toxin (Verocytotoxin) Producing *E. coli* Infections (VTEC 2006), Melbourne, Australia, poster #P09.1.04 with published abstract

Reversible Regulation of Human Lens Low Molecular Weight Protein Tyrosine Phosphatase by Oxidation

Xing K-Y, Raza A and Lou MF. 2006. 6th ACRC Conference, Beijing, China

Role of *Chlamydospores* in a Mouse Model of Disseminated Candidiasis

Navarathna DHMLP, Kebaara B, Duhamel GE and Nickerson KW. 2006. 3rd Annual Meeting of the University of Nebraska-Lincoln, Microbiology Initiative, Beadle Center, Lincoln, Nebraska, oral presentation

Safe Use of Animal Medicines

Wohlers A. 2006. Farm and Ranch Health Conference, Scottsbluff, NE, 65 participants

Serological IgG Responses against *Escherichia coli* O157:H7 Type III Secreted Proteins, Intimin and O157 Lipopolysaccharide in Adult Beef Cattle Following Experimental Infection

Bretschneider G, EM Berberov and RA Moxley. 2006. Conference of Research Workers in Animal Diseases, Chicago, Illinois, poster presentation and published abstract #P65

Staphylococcal Metabolism in a Biofilm

Somerville, GA. 2006. Great Plains Infectious Disease Meeting, University of Kansas, platform speaker

Staphylococcal Metabolism and Life in a Biofilm

Somerville, GA. 2006. University of Nebraska Medical Center, Gram-positive pathogenesis meeting, student presentated a presentation

Staphylococcal Metabolism and Life in a Biofilm

Somerville, GA. 2006. University of Nebraska-Lincoln, seminar

Strategies for Controlling Neonatal Diarrhea in Cow-Calf Herds: The Sandhills Calving System

Smith DR. 2006. Alliance for Bovine Health, Minneapolis, MN, oral and proceedings

Strategies for Controlling Neonatal Diarrhea in Cow-Calf Herds -the Sandhills Calving System

Smith DR, Grotelueschen DM, Knott T and Ensley S. 2006. 39th Annual Convention of the American Association of Bovine Practitioners, St. Paul, MN, oral and proceedings

Structural Genes Important for Virulence of Porcine Reproductive and Respiratory Syndrome Virus

BJ Kwon, IH Ansari, AK Pattnaik and FA Osorio. 2006. Presentation at the 25th Annual Meeting of the American Society for Virology, Madison, WI, abstract #W27-8

Mapping of B-Cell Linear Epitopes on nsp2 and Structural Proteins of a North American Strain of Porcine Reproductive and Respiratory Syndrome Virus

M de Lima, AK Pattnaik, EF Flores and FA Osorio. 2006. Presentation at the 25th Annual Meeting of the American Society for Virology, Madison ,WI, abstract #W 27-10

Taking the Principles of Population Dynamics and Disease Control from the Research Trial to the Farm

Smith DR. 2006. Indiana Veterinary Medical Association Annual Convention, Indianapolis, IN, invited oral presentation and paper

The Pig's Response to Porcine Reproductive and Respiratory Syndrome Virus (PRRSV): Implications for Protective Immunity and Vaccine Improvement

Osorio FA. 2006. Presentation at the Virginia-Maryland Regional College of Veterinary Medicine, Maryland Campus, College Park, MD

The Extension Veterinarian's Role in the Promotion of Public Health, and the Advancement of Medical Knowledge...Discovery

Smith DR. 2006. American Association of Extension Veterinarian's visit with Centers for Disease Control and Prevention (CDC), Atlanta, GA

The Effect of Regional Vaccination Within the Feedyard on *Escherichia coli* O157:H7 Colonization, Fecal Shedding, and Hide Contamination

Smith DR, Moxley RA, Klopfenstein TJ and Erickson GE. 2006. American Association of Extension Veterinarians, Applied Animal and Public Health Research and Extension Program Annual Meeting of the US Animal Health Association, Minneapolis, MN, oral presentation

The Effect of Regional Vaccination within the Feedyard on *Escherichia coli* O157:H7 Colonization, Fecal Shedding, and Hide Contamination

Smith DR, Moxley RA, Klopfenstein TJ and Erickson GE. 2006. National Cattlemen's Beef Association, Beef Industry Safety Summit, Jacksonville, Florida, oral presentation with published Beef Industry Safety Summit Executive Summary, Beef Industry Food Safety Council, pp. 10-11

The Nebraska Veterinary Diagnostic Laboratory System Presentation

Doster AR. 2006. Scientists from the Chinese Department of Agriculture, University of Nebraska-Lincoln, Lincoln, NE, Oral Presentation

The Effect of Regional Vaccination Within the Feedyard on *Escherichia coli* O157:H7 Colonization, Fecal Shedding, and Hide Contamination

Smith DR, RA Moxley, TJ Klopfenstein and GE Erickson. 2006. National Cattlemen's Beef Association, Beef Industry Safety Summit, Jacksonville, Florida, Oral Presentation and published in Beef Industry Safety Summit Executive Summary, Beef Industry Food Safety Council, pp 10-11

The Biological Function of Reactive Oxygen Species (ROS) in Growth Factor Signaling in Lens and Cornea Epithelial Cells

Lou MF, Chen C-W, Hou Y, Qin P, Qui W-Y and Y-F Yao. 2006. XVII ICER, Argentina

The Metabolic Requirements of Staphylococcal Biofilm Growth: A Chink in the Armor?

Somerville, GA. 2006. Loyola University, Chicago, IL

The Physiological Function of Reactive Oxygen Species in the Eye Lens

Lou MF. 2006. Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center

The Mechanism of Reactive Oxygen Species (ROS)-Dependent PDGF Signaling in Human Lens Epithelial Cells

Wang Yin, Zhang W and Lou M. 2006. XVII ICER, Argentina

Thioltransferase Knockout Decreases Tolerance to Oxidative Stress in Cultured Lens Epithelial Cells

Löfgren S, Fernando R, Ho Y-S and Lou MF. 2006. XVII ICER, Argentina

Today's Veterinarian

Wohlers A. 2006. Rural Schools Career Day, Scottsbluff, NE, 70 students

Update on Porcine Reproductive and Respiratory Syndrome Virus Research that Provides Support for the Chilean PRRSV Eradication Campaign

Osorio FA. 2006. Presentation at ASPROCER (Chilean Swine Producers Association), Santiago, Chile

Update on Diagnosis and Control of Swine Dysentery

Duhamel GE. 2006. North Carolina Swine Practitioners Meeting, Wallace, North Carolina, oral presentation

Vaccination Against PRRS

Osorio FA. 2006. Program for Chinese Swine Vets and Farm Managers, sponsored by National Grains Council, at University of Nebraska-Lincoln

Vaccination to Control *Escherichia coli* O157:H7 in Feedlot Cattle

Moxley RA. 2006. Invited seminar speaker, Department of Veterinary Science and Department of Biology and Microbiology, Molecular and Cellular Biology Seminar Series, South Dakota State University, Brookings, South Dakota

Veterinarians in Zoos

Wohlers A. 2006. Zoofari Youth Program–Riverside Zoo, Scottsbluff, NE, 15 students

Viral Antigen Distribution in Alpacas Persistently Infected with Bovine Viral Diarrhea Virus

Henningson JN, Topliff CL, Steffen DJ, Brodersen BW, Smith DR and Kelling CL. 2006. North Central Veterinary Laboratory Diagnosticians

Viral Antigen Distribution in Alpaca's Persistently Infected with BVDV

Steffen, DJ. 2006. American Association of Veterinary Laboratory Diagnosticians, North Central Veterinary Laboratory Diagnosticians, graduate student presentation, Proceedings of the North Central Conference of Veterinary Laboratory Diagnosticians

Visualization of Intracellular Transport of Vesicular Stomatitis Virus Nucleocapsids In Living Cells

Das SC, Nayak D, Zhou Y and Pattnaik AK. 2006. 25th Annual Meeting of the American Society for Virology, University of Wisconsin-Madison, USA, oral presentation

Visualization of Intracellular Transport of Vesicular Stomatitis Virus Nucleocapsids In Living Cells

Pattnaik AK, Das SC, Nayak D and Zhou Y. 2006. 13th International Conference on Negative Strand Viruses, Salamanca, Spain, oral presentation

What Veterinarians Should Know About Surveillance and Control of *Escherichia coli* O157:H7 in Feedlot Cattle

Smith DR. 2006. Texas A&M University Annual Food Animal Conference, College Station, TX, invited oral presentation with proceedings

What Veterinarians Should Know About the Surveillance and Control of *Escherichia coli* O157:H7 in Feedlot Cattle

Smith DR. 2006. Nebraska Veterinary Medical Association Winter Meeting, Omaha, NE, invited oral presentation and paper

Wildlife Diseases

Doster AR. 2006. Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln, Lincoln, NE, oral presentation

Department of Veterinary and Biomedical Sciences
Selected Committee, Editorial and Other Appointments

➢Raul G. Barletta

2006	- Ad-hoc Reviewer for Applied and Environmental Microbiology, Infection and Immunity, Journal of Clinical Microbiology and Vaccine
June 2006	- Ad-hoc Panel Member, NIH, Center for Scientific Review, Bacterial Pathogensis (BACP) Study Section
March 2006	- Ad-hoc Panel Member, NIH, Center for Scientific Review, AIDS-associated Opportunistic Infections and Cancer (AOIC) Study Section
2005-present	- Peer Review Committee, Member
2005-2006	- Veterinary & Biomedical Sciences Department Head Search Committee
2004-present	- Graduate Committee, Member
2003-present	- Chair, Biomedical Sciences Group Life Sciences Interdisciplinary Graduate Recruitment Program (LSIGRP)
2002-present	- Member, Center for Redox Biology
2000-present	- Radiation Safety Committee
1999-present	- Safety Committee Chair, Department of Veterinary & Biomedical Sciences
1997-present	- Book Chair, Department of Veterinary and Biomedical Sciences
1997-present	- Member, Comparative Microbiology and Pathobiology Graduate Research Emphasis Group
1991-present	- Affiliate Member, Center for Biotechnology

➢Bruce W. Brodersen

2005-present	- Departmental Curriculum Committee
2004-present	- BVD Ad Hoc Committee for Academy of Veterinary Consultants
2004-2006	- Committee for Immunohistochemistry Quality Control, American Association of Veterinary Laboratory Diagnosticians
2003-2004	- Vice Chancellor's Task Force on the Nebraska Veterinary Student Contract
2004-2005	- Veterinary School Student Selection Committee, Chairman Public Relations Committee, Nebraska Veterinary Medical Association
2001-present	- Chair, George A. Young Swine Health and Management Conference, Responsible for annual submission of cases to the Armed Forces Institute of Pathology for participation in the Wednesday Slide Conference

➢Michael P. Carlson

1997-present	- IANR Pesticide Advisory Committee, member
2003-present	- CASNR Recruitment, Retention and Placement Committee, departmental representative
2006-present	- CASNR Web Framework/CMS Standards Group, departmental representative
2005-present	- VBMS Curriculum Committee, member
2006-present	- VBMS Husker Harvest Days Committee

➢Alan R. Doster

National

- Review Committee, Journal of Swine Health and Production
- Reviewer, National Pork Producer Council PRRS Research Initiative Grants, Summer 2006
- Reviewer National Pork Board Research Proposals, Fall 2006
- Conference Chairman, North Central Conference of Laboratory Diagnosticians, June 2006

State

- University Liaison Committee, Nebraska Veterinary Medical Association
- Nebraska Veterinary Medical Association Student Scholarship Committee
- Pseudorabies Advisory Committee: ex-official member
- Student Mentor, Nebraska Pork Producers Association
- Additional $13,043.15 in research funds generated for VDC revolving account

University

- ISU-UNL Veterinary School Liaison Committee
- New Student Enrollment

Departmental

- Veterinary Gross Anatomist Search Committee, Chairman
- Veterinary Pathologist Search Committee
- Veterinary Anesthesiologist and Surgeon Search Committee
- Reviewer for Dr. Gray Rupp's ARD Project

Other Accomplishments in 2006

In 2005, permission was given to use a number of my photographs and photomicrographs to Dr. James Zachary, College of Veterinary Medicine, University of Illinois, co-editor of Pathological Basis of Veterinary Disease (McGavin MD and Zachary JF). I gave a blanket authorization to Dr. Zachary to publish any of my photographs he needed for illustration purposes in his book. I have several photographs in the new edition which was published in August 2006

➢Gerald E. Duhamel

- Panel Member, NIH, United States Department of Health and Human Services, Center for Scientific Review
  Special Emphasis Panel, ZRG1 IDM-A 90S, Bacterial Pathogenesis
  - March 9-10, 2006
  - October 12-13, 2006
- Panel Member, Natural Sciences and Engineering Research Council of Canada, Integrative Animal Biology Grant Selection Committee 2004-2007

- External Scientific Examiner, Porcine Infectious Disease Research Center, University of Montreal, Faculty of Veterinary Medicine, Saint-Hyacinthe, Quebec, Canada
- Advisor/Observer, National Committee for Clinical Laboratory Standards, Veterinary Antimicrobial Susceptibility Testing Sub-committee 2001-present
- Member, Bacteriology/Mycology Committee, Anaerobic Techniques Sub-committee, American Association of Veterinary Laboratory Diagnosticians 1996-present
- Co-representative, NC-1007 Technical Committee on Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, Nebraska Agriculture Experiment Station 1988-present
- *Ad Hoc* External Reviewer
  Quebec Government, Nature and Technologies Research Fund, Strategic Group Grant Program 2006
- Scientific Committee
  International Pig Veterinary Society Congress, Copenhagen, Denmark 2006
- Associate Editor
  Microbiology, Society for General Microbiology, United Kingdom, 2004-2009
- *Ad Hoc* Reviewer for Peer-reviewed Scientific Journals
  - Veterinary Pathology
  - Journal of the American Veterinary Medical Association
  - Journal of Veterinary Diagnostic Investigation
  - Journal of Clinical Microbiology
- UNL Institutional Biosafety Committee, Member 1995-present
- UNL Institutional Animal Care and Use Committee Member, 2000-present, Chair, 2003-2004
- UNL Search Committee
  Head of Department of Veterinary & Biomedical Sciences, Member 2006
- UNL Animal Research Facility Renovations Advisory Committee, Member 2006
- UNL Microbiology Initiative Steering Committee, Member 2001-present
- UNL Center for Biotechnology, Microscopy Core Facility Advisory Committee, Member 2002- present
- UNL Molecular Bioscience & Biotechnology Integrated Graduate (MoBBIG) Training Program Executive Committee, Member 2006
- Departmental Peer Review Committee, Chair 2005; Member 2002-2008
- Department of Veterinary and Biomedical Sciences Search Committees
  - Veterinary Immunologist, Chair 2006
  - Veterinary Pathologist, Member 2006
- Integrative Biomedical Sciences Graduate Committee
  Chair, 2005-2008; Member, 2003-2008
- Departmental Undergraduate Research Coordinator 2004-2006
- Veterinary Basic Science Glassware Cleaning and Sterilization Facility Supervisor 2001-2006

➢Dicky D. Griffin

- National Cattlemen's Beef Association, Beef Quality and Safety Taskforce
- Academy of Veterinary Consultants, Chairman Standards of Practice Committee
- Reviewer for the American Journal of Veterinary Research
- Reviewer for the Journal of the American Veterinary Medical Association
- Reviewer for the American Association of Bovine Practitioner

➢Clinton J. Jones

- Reviewed manuscripts for Journal of Virology (3); Journal of Neurovirology (4); Journal of Clinical Microbiology (1); Journal of General Virology (1); Journal of Chemico-Biol. Interactions (1); Journal of Interferon Research (1) and Virus Research (2)
- Grant reviewer for American Association for the Advancement of Science (AAAS)
- Served on the Scientific Advisory Council for the Internnational Herpesvirus Workshop
- Assistant Director, Nebraska Center for Virology; November 2002-present
- Organized the annual Intercampus Virology Meeting

➢Clayton L. Kelling

- Chair (2000, 2001, 2004), Member (1996-02, 2003-06), VBMS Peer Review Committee
- Chair (2000, 2001, 2004), Member (1996-02, 2003-06), VBMS Promotion and Tenure Committee
- Member (2004-07), IBMS Graduate Committee
- Member (1993-present), VBMS Curriculum Committee
- Treasurer(2005-2006), Nebraska Chapter of Gamma Sigma Delta

➢Marjorie F. Lou

2005 - Organizer and session chairman of meetings/conferences
2006 - Organizer of the 6th Asian Cataract Research Conference in Beijing, China
2006 - Co-chair of "Oxidation and Cataract" at the 6th Asian Cataract Research Conference in Beijing, China
2006 - Chair and organizer of the symposium on the Yin and Yan of Reactive oxygen species in the cellular function of ocular tissues, XVII International Congress of Eye Research, Buenos Aires, Argentina

Manuscript Reviewer, 2006

- Investigative of Ophthalmology and Visual Science (5); Molecular Vision (2); Experimental Eye Research (3) and Free Radical in Biology and Medicine (1)

Committees, 2006

Departmental

1998-present - Chairperson, Space Utilization Committee
2001-present - Graduate Student Committee Member for the Center for Biological Chemistry Program
2006 - Search Committee, Immunologist of Veterinary and Biomedical Sciences Department

IANR

2006 - Search Committee member for the Department head of Biochemistry

University

2004-2006 - Appointed member of the Women's Council, University of Nebraska System
2005-present - Committee member, renovation of Animal Research Facility (ARF)

Scientific Community

2006 - Conference Organizer, 6th Asian Cataract Research Conference (ACRC) in Beijing, China
1998-present - Elected member, Board of Trustees for the National Foundation for Eye Research
2004-2007 - Elected Chairman, Council of Membership Committee for North America, International Society of Eye Research

➢*D. Scott McVey*

2006 - Immunologist Search Committee, VBMS

Continued National and International Service

a. - American College of Veterinary Microbiologists - Chair, Continueing Education Fund Raising Committee, CE Program Committee, AAVLD Liason Committee, Immunology Certification Test Committee
b. - Consultant to The Ruckelshaus Institute and Haub School of Environmental and Natural Resources (with U.S. Departments of Agriculture and Interior) – Brucellosis Working Symposium (for elk and bison populations in national parks and forests)
c. - Member of the Biosecurity Task Force, American College of Veterinary Microbiologists, Food Security Institute, Iowa State University

➢*Rodney A. Moxley*

2005-2007 - Editorial Board, Infection and Immunity, American Society for Microbiology Press
2006 - Ad hoc reviewer, Applied and Environmental Microbiology, American Society for Microbiology Press
2006 - Ad hoc reviewer, Journal of Virology, American Society for Microbiology Press
2002-2007 - Nebraska Station Representative, USDA-CSREES Multi-State Research Technical Committee, NC-1007 Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety
2006-2008 - Chair, UNL Institutional Biosafety Committee
2003-indefinite - Chair, Curriculum Committee, UNL Department of Veterinary & Biomedical

Sciences

2004-indefinite - Coordinator, VBMS Outcome Assessment Program
2005-2008 - Member, VBMS and IBMS Graduate Committee
2004-2007 - Senator, District I16A, VBMS, Member, UNL Academic Senate
2003-2006 - Member, St. Elizabeth Regional Medical Center Research Council

➢Fernando A. Osorio

2005-2008
- Editorial Board, Journal of Swine Health and Production, AASV
- Ad hoc Reviewer, Journal of Virology; Journal of General Virology; Viral Immunology; Veterinary Microbiology; Vaccine and Antiviral Research
- External Reviewer, faculty promotion files being considered, University of Guelph and University of Illinois
- Court expert witness, in case vaccine patent litigation, advising Kenyon & Kenyon, LLP, Washington, DC
- Nebraska Representative to the NC-229 (PRRSV Research) ARD Multi-State Project

University Committees

2006-2009 - VBMS Peer Review Committee, Member
2006-present - IACUC/VBMS Alternate Representative
2006 - Search Committee, BSL-3 Director, Chair
2006 - Search Committee, Immunologist
2006 - Search Committee, Veterinary Epidemiologist GPVEC
2006 - Search Committee, Beef Specialist GPVEC
2006 - Search Committee, Neurobiologist

➢Asit K. Pattnaik

2002 - Ad hoc reviewer, Experimental Virology Study Section, NIH
2003 - Member, Special Study Section, Bio-terrorism and Emerging Viruses, NIH
2005 - Ad hoc reviewer, AIDS and Opportunistic Infections and Cancer Study Section, NIH
2006 - Manuscript reviewer for publication in Journal of Virology; Proceedings of National Academy Science, USA; Virology, Antimicrobial Agents and Chemotherapy and Journal of Clinical Microbiology

➢Gary P. Rupp

- Nebraska College of Technical Agriculture Advisory Committee
- South Central Cattleman, Board of Directors
- Journal of Theriogenology, Ad Hoc Reviewer
- Nebraska Veterinary Student Selection Committee
- Departmental Promtion and Tenure Committee

➢David R. Smith

2005-present	- Food Safety Advisory Committee, American Veterinary Medical Association, Vice-Chairman, 2006; Chairman 2006-2007
2005-2007	- President, Epidemiology Specialty, American College of Veterinary Preventive Medicine
2005-2006	- Panelist: USDA/CSREES, NRI Competitive Grants Program, 44.0 Animal Protection, Panel C
2005-present	- Steering Committee, Alliance for Bovine Health
2006	- Advisory Board, Washington State Antibiotic Stewardship Advisory Board
1999-present	- Food Quality, Safety, and Security Committee, American Association of Bovine Practitioners
1999-present	- Co-manager, AABP-L listserve, American Association of Bovine Practitioners, 1750+ subscribers from 60+ countries
2005-present	- Scientific Program Planning Committee, American Association of Extension Veterinarians
2005-present	- Continuing Education Committee, NebraskaVeterinary Medical Association
2000-present	- Board of Directors, Nebraska State Dairymen's Association
1998-present	- Nebraska Bureau of Animal Industry, Johne's Disease Advisory Committee
2006	- Chair, Search Committee, Veterinary Surgery/Anesthesiology, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln
2006	- Search Committee, Veterinary Epidemiologist, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln
2006	- Search Committee, Beef Cattle Veterinarian, Department of Veterinary Diagnostic and Production Animal Medicine, Iowa State University, College of Veterinary Medicine

➢Greg A. Somerville

Ad hoc Reviewer

- Antimicrobial Agents and Chemotherapy
- Archives of Microbiology
- BMC Microbiology
- Infection and Immunity
- Journal of Bacteriology
- Journal of Clinical Microbiology
- Journal of Microbiological Methods
- Molecular Microbiology

Committees

- Faculty Coordinator, weekly Department of Veterinary and Biomedical Sciences seminar series
- Graduate Fellowship Committee
- Life Sciences Interdisciplinary Graduate Recruitment Program, Admissions Committee
- VBMS Graduate Education Committee

- Member, Search Committee, Parasitologist/Entomolgist, 2006
- Member Search Committee, Gross Anatomist, 2006

Appointments and Affiliations

- Department of Biochemistry,University of Nebraska-Lincoln
- Redox Biology Center, University of Nebraska-Lincoln
- Department of Pathology and Microbiology, University of Nebraska Medical Center
- Center for Bacterial Pathogenesis Research, University of Nebraska Medical Center
- Adjunct appoitment, University of South Dakota, Graduate School

➢*David J. Steffen*

1996-2006	- Departmental Peer Review Committee
1997-2000	- Social Committee
2002-2006	- Various Search Committees; Chair, Poultry Veterinarian Search Committee, Microbiologist Search Committee; Curriculum Committee member; Curriculum Committee Chair; Department Chair Search Committee; Bacteriologist Search Committee, Chair; Chair, Pathologist Search Committee; Member, Peer Review Committee; Quality Control Committee; Information System Selection Committee
1995-present	- Ad Hoc Reveiwer for Veterinary Pathology
1996-present	- Associate Editor, Journal of Veterinary Diagnostic Investigations
1997-2009	- AAVLD By-Laws Committee Member
1998-2006	- Publications Committee, Chair, 2001-2006
2000-present	- Program Committee
2000-present	- Director's Committee
2005-2008	- Executive Board

➢*Arden Wholers*

- IRM Pen of 5 Group
- Feedlot Extension Group
- Panhandle REC Center and Community Relations Committee
- Panhandle REC Extension Committee
- Field Day Revitalization Committee
- NVMA Public Relations Committee
- Scottsbluff/Gering Chamber of Commerce Agriculture Committee
- North Platte Natural Resource District Board (Elected)

Department of Veterinary and Biomedical Sciences Articles Regarding the Department in 2006

"The eyes have it," Bovine Veterinarian, March/April 2006, pgs 6-10

"Joint Veterinary Program Progressing," The Leading Object, March 2006, pgs 1-2

"Profile of a PI," Bovine Veterinarian, (Dairy Herd Management and Drovers Supplement), February 2006, pgs 6-9

"BVD Eradication: The Future is Now," Beef, April 2006, pg 45

"Bridging the Cost," Beef, April 2006, pgs 46-47

"New Head of Vet Sciences, Associate Dean of UNL-ISU Program," IANR News, May 5, 2006

"New Nebraska-Iowa Program Addresses Shortage of Veterinarians," IANR News, July 24, 2006

"Johne's can Siphon Profits from a Herd," Nebraska Farmer, pg 42, August 2006

"Going Forward with BQA," Beef, pgs 26-27, September 2006

"Research Essential in Disease Prevention," Extended Visions, pgs 1-3, September/October 2006

"About the People," Extended Visions, pgs 2-3, September/October 2006

"Iowa, Nebraska Address Vet Shortage," Beef, pg 6, September 1, 2006

"Feedlot Lameness Poster," pg 32, Bovine Veterinarian, November 2006

Department of Veterinary and Biomedical Sciences
Departmental Budget Summaries

Table 10. Budget, Veterinary and Biomedical Sciences Department, Fiscal Year 2006

FY Budget	FTE*	Personnel	Benefits	Operating	Totals
Teaching	8.52	491,754	112,982	94,021	**698,757**
Research	48.5	2,519,207	613,232	140,147	**3,272,586**
Extension	2.78	175,756	51,583	27,937	**255,276**
TOTAL	**59.8**	**3,186,717**	**777,797**	**262,105**	**4,226,619**

*Includes faculty and staff

Table 11. Summary of Other Income*

Source of Income	Amounts
Animal Health Funds	111,574
Multi-State Research Funds	52,500
Tobacco Research Funds	5,000
Interdisciplinary Research Funds	20,000
Grants Received	2,523,719
Research Revolving Income	52,611
Teaching Revolving Income	19,822
Extension Revolving Income	9,845
Diagnostic Revolving Income	1,719,215
TOTAL	**4,514286**

*Includes AOC funds

Table 12. Nebraska Veterinary Diagnostic Laboratory System Revolving Account Summary for FY 2006

LINCOLN DIAGNOSTIC LAB (VDC)			
Income	Personnel Expense	Operating Expense	Balance
1,719,215	**504,917**	**1,097,064**	**117,234**

Table 13. Nebraska Cash Receipts* from Farm Marketings by Commodity, 2005**
Total All Commodities = $11,470,159

LIVESTOCK PRODUCTS			CROPS		
Commodity	$ Value in Thousands	% of Total	Commodity	% Value in Thousands	% of Total
Livestock & Products	7,545,285	65.8	Food Grains	520,681	***
Meat Animals	658,164	***	Rye	***	***
Cattle & Calves	6,458,277	56.3	Wheat	205,815	1.8
Hogs	768,322	6.7	Millet, Proso	12,159	0.1
Sheep & Lambs	12,092	0.1	Feed Crops	332,784	***
Dairy Products	164,164	1.4	Oats	2,234	0.0
Milk, Wholesale	686,196	***	Barley	136	0.0
Poultry & Eggs	144,624	***	Corn	2,085,894	18.2
Broilers	12,232	0.1	Hay	115,576	1.0
Farm Chickens	15	0.0	Sorghum Grain	42,640	0.4
Chicken Eggs	82,989	0.7	Oil Crops	1,831	***
Other Poultry	9,185	***	Misc Oil Crops	1,831	***
Misc. Livestock	125,556	***	Soybeans	1,213,207	10.6
Honey	2,421	0.0	Sunflower	***	***
Wool	240	0.0	Vegetables	960,989	***
Other Livestock	38,388	***	Dry Beans	63,489	0.6
Crops	3,924,874	34.7	Potatoes	42,484	0.4
Other Berries	4,495	***	Misc. Vegetables	128,000	***
Other Seeds	6,980	***	Greenhouse/nursery	33,700	0.3
Fruits & Nuts	2,043,378	***	All Other Crops	664,770	***
Misc Fruits & Nuts	860	***	Net Farm Income	2,699,540	***
Sugar Beets	41,895	0.4	All Other Livestock	32,450	***
Other Field Crops	70,000	***			

* Data from Nebraska Agricultural Statistics
** Most current data available
*** Data not available

Table 14. Nebraska Agriculture - Rank in Agribusiness Facts (May 2006)*,**

Rank, Commodity and Date	Number	Units	% of US Total
1st Commercial livestock slaughter, live weight, 2005	11,012,211,000	*Pounds*	15.9
1st Commercial red meat production, 2005	7,047,500,000	*Pounds*	15.4
1st Great Northern bean production, 2005	1,382,000	*Cwt.*	87.2
1st Light red kidney bean production, 2005	304,000	*Cwt.*	27.4
2nd Commercial cattle slaughter, live weight, 2005	9,078,200,000	*Pounds*	22.3
2nd Commercial cattle slaughter, number, 2005	7,028,900	*Head*	21.7
2nd Cash receipts from all meat animals, 2004	6,970,380,000	*Dollars*	11.2
2nd Cash receipts from cattle and calves, 2004	6,196,896,000	*Dollars*	13.1
2nd Proso millet production, 2005	4,250,000	*Bushels*	31.4
2nd Pinto beans production, 2005	1,982,000	*Cwt.*	15.1
2rd All cattle on feed, January 1, 2006	2,600,000	*Head*	18.4
3nd Total value of all cattle and calves, January 1, 2006	6,419,000,000	*Dollars*	6.6
3nd All dry edible beans production, 2005	3,870,000	*Cwt.*	14.2
3rd Cash receipts from all feed grains, 2004	2,719,244,000	*Dollars*	9.6
3rd Cash receipts from corn, 2004	2,543,705,000	*Dollars*	11.5
3rd Cash receipts from sorghum grain, 2004	60,519,000	*Dollars*	7.2
3rd Cash receipts from livestock and livestock products, 2004	7,338,183,000	*Dollars*	5.9
3rd All cattle and calves, January 1, 2006	6,550,000	*Head*	6.7
3rd Fed cattle marketed (1,000+ capacity lots), 2005	4,420,000	*Head*	19.9
3rd Corn for grain production, 2005	1,270,500,000	*Bushels*	11.4
3rd Sorghum for grain production, 2005	21,750,000	*Bushels*	5.5
4rd Cash receipts from all commodities, 2004	11,779,728,000	*Dollars*	4.9
4th Beef cows and heifers that have calved, January 1, 2006	1,930,000	*Heads*	5.8
4th Land in farms and ranches, 2005	45,7000,000	*Acres*	4.9
4th All hay production, 2005	6,945,000	*Tons*	4.6
4th On-farm grain storage capacity, December 1, 2005	1,050,000,000	*Bushels*	9.2
4th Off-farm grain storage capacity, December 1, 2005	691,186,000	*Bushels*	8.1
5th Net farm income, 2004	3,459,064,000	*Dollars*	4.2
5th Cash receipts from soybeans, 2004	1,280,621,000	*Dollars*	7.0
5th Cash receipts from all oil crops, 2004	1,287,932,000	*Dollars*	6.5
5th Cash receipts from hogs and pigs, 2004	761,953,000	*Dollars*	5.3
5th Soybean production, 2005	235,330,000	*Bushels*	7.6
5th Calf crop, 2005	1,800,000	*Head*	4.8

Rank, Commodity and Date	Number	Units	% of US Total
5th Commercial hog slaughter, live weight, 2005	1,933,729,000	*Pounds*	6.9
5th Commercial hog slaughter, number 2005	7,185,800	*Head*	6.9
6th Alfalfa hay production, 2005	4,625,000	*Tons*	6.1
6th Value of principal crops produced, 2005	4,423,595,000	*Dollars*	4.3
6th Pig crop, 2005	6,327,000	*Head*	6.1
6th Value of all hogs and pigs on farms, December 1, 2005	279,300,000	*Dollars*	4.9
6th Winter wheat production, 2005	68,640,000	*Bushels*	4.6
6th All hogs and pigs, December 1, 2005	2,850,000	*Head*	4.6
7th Sunflower production, 2005	142,000,000	*Pounda*	3.5
7th Harvested acreage, principle crops, 2005	18,508,000	*Acres*	6.1
7th Sugarbeet production, 2005	924,000	*Tons*	3.3
7th Sorghum silage production, 2005	210,000	*Tons*	5.0
7th Cash receipts from crops, 2004	4,441,545,000	*Dollars*	3.8
7th Cash receipts from sugarbeets, 2004	36,420,000	*Dollars*	2.9
7th Table eggs produced, 2005	3,217,000,000	*Eggs*	4.2
9th Oat production, 2005	4,380,000	*Bushels*	3.8
10th Corn silage production, 2005	3,100,000	*Tons*	2.9
10th All wheat production, 2005	68,640,000	*Bushels*	3.3
10th Cash receipts from wheat, 2004	217,810,.000	*Dollars*	3.0
10th Other hay (excludes alfalfa) production, 2005	2,320,000	*Tons*	3.1
11th All potato production, 2005	8,245,000	*Cwt.*	2.0
12th All chickens, Decembe 1, 2005	13,813,000	*Head*	3.1
13th Value of all chickens on hand, December 1, 2005	29,007,000	*Dollars*	2.6
14th Cash receipts from all food grains, 2004	218,753,000	*Dollars*	2.4
14th Cash receipts from potatoes, 2004	42,977,000	*Dollars*	1.8
14th Cash receipts from chicken eggs, 2004	138,863,000	*Dollars*	2.6
15th Honey production, 2005	2,720,000	*Pounds*	1.6
15th Wool production, 2005	600,000	*Pounds*	1.6
15th All sheep and lambs, January 1, 2006	106,000	*Head*	1.7
15th Value of wool production, 2005	240,000	*Dollars*	0.9
17th Cash receipts from hay, 2004	102,187,000	*Dollars*	2.3
18th Number of farms, 2005	48,000	*Farms*	2.3

***/Data from USDA/NASS, Lincoln, NE; **/Most current data available**

Appendix

The 47th Annual George A. Young Swine Health and Management Conference

August 17, 2006

Conference Location
Marina Inn
Fourth & 'B' Street
South Sioux City, NE

45th Annual Meeting of the North Central Conference of Veterinary Laboratory Diagnosticians

June 8-9, 2006

Conference Location
Holiday Inn Downtown
141 North 9th Street
Lincon, NE

Sponsors
University of Nebraska-Lincoln
Institute of Agriculture and Natural Resources
Nebraska Cooperative Extension and
College of Agriculture and Natural Resources
Department of Veterinary and Biomedical Sciences

THE 47TH ANNUAL
GEORGE A. YOUNG
SWINE HEALTH AND MANAGEMENT CONFERENCE

August 17, 2006

"Achieving the Best of Production Through Knowledge"

MARINA INN
Fourth & B Streets
South Sioux City, Nebraska 68776

- Swine Industry Economics
- Swine Diseases
- Production and Management Strategies

Sponsors

University of Nebraska–Lincoln
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln Extension
Department of Veterinary and
Biomedical Sciences

University of Nebraska Lincoln

PROGRAM

8:00 am	Registration (with coffee and rolls)
8:25	*Welcome* - Dr. Bruce Brodersen, Conference Chair
8:30 - 9:30	"Recent advances in research related to porcine circovirus type 2" – Dr. Tanja Opriessnig
9:30 - 10:15	"Epidemiology and Control of Porcine Circovirus type 2 Infections" – Dr. Robert Desrosiers
10:15-10:30	BREAK
10:30 - 11:15	"Diagnosis of PCV2-Associated Disease (PCV2-AD)" – Dr. Kent J. Schwartz
11:15 - 12:00	"Managing PCVAD in Nursery Settings" – Dr. Cameron Schmitt
12:00 pm	LUNCH
1:00 - 1:45	"Canadian Experiences with Porcine Circovirus Associated Disease" – Dr. George Charbonneau
1:45 - 2:30	"A Practitioner's Perspective on Porcine Circovirus Disease in Finishers; Diagnostic Approaches and Control" – Dr. Keith Schumacher
2:30 - 3:15	"Teshoviruses, Enteroviruses, and other potential triggering agents isolated from finisher mortality syndromes diagnosed as Porcine Circovirus Associated Disease (PCAD)" – Dr. Butch Baker

The Conference has been approved for 5 ½ hours of Nebraska Veterinary Continuing Education credits.

INTRODUCTION

Pork producers, large animal and swine practitioners, faculty in the animal and veterinary sciences, and industry representatives will benefit from this update of research and industry developments as they relate to modern swine production and technology.

The George A. Young Swine Conference has a long-standing tradition of providing up-to-date information on developments in research and production techniques as they relate to today's swine industry. Industry experts have come to respect this conference as their annual opportunity to communicate with colleagues, and to interact with others throughout the spectrum of swine research and production.

GUEST PARTICIPANTS

Dr. Tanja Opriessnig — Assistant Professor, Department of Veterinary Diagnostic and Production Animal Medicine; Iowa State University

Dr. Robert Desrosiers — Technical Services Swine Veterinarian, Boehringer Ingelheim Vetmedica, Saint-Hyacinthe, Quebec, Canada

Dr. Kent J. Schwartz — Veterinary Diagnostician, Department of Veterinary Diagnostic and Production Animal Medicine; Iowa State University

Dr. Cameron Schmitt — Veterinary Practitioner, Pipestone Veterinary Clinic, Pipestone, Minnesota

Dr. George Charbonneau — Veterinary Practitioner, Swine Services Group, Stratford, Ontario, Canada

Dr. Keith Schumacher — Veterinary Practitioner, Howells Veterinary Service, Howells, Nebraska

Dr. Rodney (Butch) Baker — Clinical Associate Professor, Swine Health and Production Medicine, College of Veterinary Medicine, North Carolina State University

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES (IANR) AND UNIVERSITY OF NEBRASKA PROGRAM PARTICIPANTS

Dr. Bruce Brodersen — Associate Professor, Dept. of Veterinary and Biomedical Sciences, Veterinary Diagnostic Center, University of Nebraska; Lincoln, Nebraska

PROGRAM COMMITTEE

Bruce Brodersen, Chair
Sharon Clowser, Conference Coordinator
Ron Brodersen, Whole Hog Health Center
Mike Brumm, Univ. of NE Haskell Agricultural Laboratory
Tom Buelt, Pfizer Animal Health
Larry Germer, Gage County Extension Educator
David Hansen, Producer
Phil Hardenburger, Crete Veterinary Clinic
Jeff Husa, Boehringer Ingelheim Vetmedica, Inc.
Jim Unwin, Red Barn Veterinary Clinic

PROGRAM OVERVIEW

"Recent advances in research related to porcine circovirus type 2" – Dr. Tanja Opriessnig

Porcine circovirus type 2 (PCV2) is considered to be the third most important viral pathogen in the US pig population. Its ubiquitous distribution in the pig population and its presence in healthy as well as in diseased herds distinguishes PCV2 from most classical swine pathogens. Research has helped us to understand that vaccination with commonly used bacterins can enhance PCV2-associated lesions but that this effect can be reduced by optimal timing of vaccination. We also found that vaccine efficacy can be reduced when pigs are in the acute stages of PCV2 infection at the time they were vaccinated with a MLV PRRSV vaccine. Coninfection with common swine pathogens such as PPV or *M. hyopneumoniae* results in clinical PMWS in a conventional pig model. We found evidence that a certain line of Landrace pigs are more susceptible to develop PCV2-associated disease compared to Duroc and Large White pigs. We have first evidence for differences in virulence between PCV2 isolates. PCV2 appears to be easily transmittable by oral consumption of pork products.

"Epidemiology and Control of Porcine Circovirus type 2 Infections" – Dr. Robert Desrosiers

While porcine circovirus type 2 has been found in all tested herds so far in the US and Canada, problems associated with it are only present in some of them. Furthermore, recently some areas like Eastern Canada and North Carolina suddenly began to experience severe losses thought to be related to this organism. This presentation will look at potential explanations, as well as to what can be done to control these losses.

"Diagnosis of PCV2-Associated Disease (PCV2-AD)" – Dr. Kent J. Schwartz

As a ubiquitous viral infection of swine, assigning significance to presence of PCV2 (or antibodies to PCV2) requires some interpretation. History, clinical signs, lesions (gross and microscopic) are coupled with the results of a variety of diagnostic assays, before rendering a diagnosis of PVC2-AD. Diagnostic strategies should always include detection of other agents and risk factors for complete diagnosis. Agent, antigen, and antibody detection methods and diagnostic strategies will be discussed.

"Managing PCVAD in Nursery Settings" – Dr. Cameron Schmitt

This presentation is a case based description of diagnostic testing, treatment protocols, management factors, and opinions on minimizing the impacts of this disease. Specific details relating to husbandry, feeding, medication, vaccination and sow herd changes that can be made to reduce PCV2 challenge will be discussed.

"Canadian Experiences with Porcine Circovirus Associated Disease" – Dr. George Charbonneau

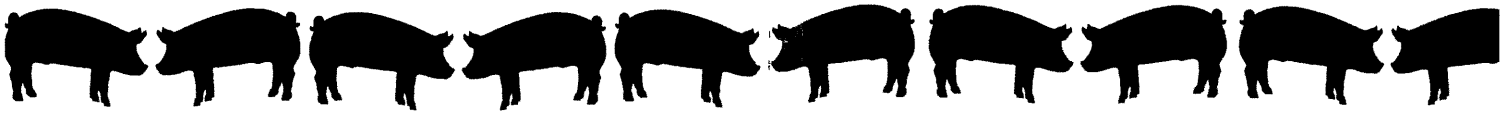
Porcine Circovirus Associated Disease (PCVAD) has occurred sporadically in Ontario since the mid 1990's after it was first described by Dr. John Harding and Dr. Ted Clark in Western Canada. Starting in the fall of 2004 there has been a significant increase in the both the incidence and severity of PCVAD with most of the increased problems occurring in finishing barns. This presentation will describe the clinical presentation and diagnosis of PCVAD in Ontario. Interventions that have been used in the treatment, control and prevention of the disease will be discussed.Some PCV type 2 vaccines are now available in Canada under conditional licensing and initial experiences with these vaccines will be discussed.

"A Practitioner's Perspective on Porcine Circovirus Disease in Finishers; Diagnostic Approaches and Control" – Dr. Keith Schumacher

There has been a significant increase in incidence and severity of porcine circovirus associated disease in Nebraska. Many of the cases involve finishing swine. This presentation will describe the clinical manifestations and diagnosis of the more severe circovirus associated disease in Nebraska. Attempts at management and treatment will also be discussed.

"Teshoviruses, Enteroviruses, and other potential triggering agents isolated from finisher mortality syndromes diagnosed as Porcine Circovirus Associated Disease (PCAD)" – Dr. Rodney B. Baker

Although PCV-2 virus has long been ubiquitous in the US swine industry it has only recently become an important apparent pathogen in large production systems and certain other industry segments. New genetic PCV2 isolates most closely related to European viruses have emerged in most of these high mortality outbreaks. Importation of this new virus subtype could logically have been accompanied by other more difficult to characterize agents. It appears that Porcine Enteroviruses and Teshoviruses are frequently isolated from these outbreaks and from typical lesioned tissues. The question is are these "Red Herrings" or are they ubiquitous triggering agents in the PCAD syndrome.



SPONSORS

We would like to thank the following sponsors for their support and contributions in making this Conference possible:

Alpharma Animal Health
Boehringer Ingelheim Vetmedica
Elanco Animal Health
Hermitage NGT
Nebraska Pork Producers Association
Pfizer Animal Health
Waldo Farms, Inc.

CANCELLATIONS

If you must cancel your registration, please notify us prior to August 1, 2006 in order to receive a full refund. Cancellations received after August 1, 2006 will be subject to an administrative charge of $10.00.

HOTEL RESERVATIONS

For those people needing hotel accommodations, a block of rooms has been reserved for the Conference at the Marina Inn, 4th and B Streets, South Sioux City, Nebraska, 68776. The rate for a single/double occupancy room is $79.00. To make your reservations, call 1-800-798-7980 or (402) 494-4000 and ask for rooms reserved for the George Young Swine Conference.

For further information, contact Sharon Clowser, Conference Coordinator, Department of Veterinary and Biomedical Sciences, 126 VBS, P.O. Box 830905, University of Nebraska-Lincoln, Lincoln, NE 68583-0905, phone 402/472-8550; FAX 402/472-9690; E-mail address: sclowser2@unl.edu

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IANR

GEORGE A. YOUNG SWINE HEALTH & MANAGEMENT CONFERENCE

Registration Form

Name _____

Address _____

City _____

State _____ Zip _____

Phone _____ Fax _____

Email _____

Conference Fees:

_____ Pre-registration:	$ 65.00 per person
_____	$ 55.00 per person (Group of 3 or more)
_____ At the door:	$ 85.00

One Proceedings will be provided with each paid registration. Please check the one you prefer.

_____ Book _____ CD

Additional Proceedings may be ordered.

_____ Extra Proceedings—Book:	$ 20.00 at the door
_____	$ 35.00 by mail
_____ Extra Proceedings—CD	$ 10.00 at the door
_____	$ 15.00 by mail

Total Enclosed $_____

_____ Number of people attending luncheon.

Registrations received after **August 1, 2006** will be charged an additional $10.00.

Make checks payable to: **University of Nebraska**

Return this form to: George Young Conference Registration
Attn: Sharon Clowser
P.O. Box 830905
University of Nebraska–Lincoln
Lincoln, NE 68583-0905

University of Nebraska Lincoln

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES
Department of Veterinary & Biomedical Sciences

March 7, 2006

Dear Colleague:

The Department of Veterinary Science at the University of Nebraska, Lincoln invites you to attend the 45th Annual Meeting of the North Central Conference of Veterinary Laboratory Diagnosticians to be held on ***June 8th and 9th, 2006*** at the Holiday Inn Downtown, 141 North 9th Street, Lincoln, Nebraska. The Conference will be of interest to all veterinary laboratory diagnosticians and includes topics on bacteriology, immunology, pathology, parasitology, toxicology and virology. A $100 cash award will be presented to the graduate student with the best presentation. Information dealing with the meeting and hotel reservations follows.

I look forward to seeing you in Lincoln.

Sincerely,

Alan R. Doster

Alan R. Doster, DVM, PhD
Chair, North Central Conference of Veterinary Laboratory Diagnosticians

HOW TO REGISTER:

Pre-registration is recommended. Complete and return the enclosed registration form with your check or money order (we are not able to accept credit cards). ***The deadline for pre-registration is May 5, 2006.*** On-site registration will be held in the hall outside the Meeting Room in the Holiday Inn-Downtown. Your registration packet will be available at the registration desk on the day of the meeting.

REGISTRATION FEES:

The pre-registration fee is $75.00 and is payable to the Department of Veterinary and Biomedical Sciences, University of Nebraska. Registrations received after that date will be $80.00. Registration fee includes a copy of the Proceedings, coffee breaks, noon lunch on Thursday and the Banquet on Thursday evening.

HOTEL ACCOMMODATIONS:

A block of room will be held at the Holiday Inn Downtown until May 18, 2006. After that date, reservations will be taken on a space-available basis only and at the regular price. The NCCVLD rate is $71.00 per day for either the single or double rate. To make reservations, call the reservation center at: 402-475-4011. When making reservations by telephone, please refer to the North Central Conference of Veterinary Laboratory Diagnosticians Meeting to receive conference rates. Check-out time is 12 noon on Friday, June 9.

ARD/ms

Veterinary Diagnostic Center / Fair Street and East Campus Loop / P.O. Box 830907 / Lincoln, NE 68583-0907
(402) 472-1434 / FAX (402) 472-3094

ANNOUNCEMENT AND CALL FOR PAPERS

45th North Central Veterinary Laboratory Diagnosticians Conference

The 45th North Central Conference of Veterinary Laboratory Diagnosticians
will be held on **June 8th and 9th, 2006**
at the Holiday Inn Downtown, 141 North 9th Street, Lincoln, Nebraska.

Titles of papers should be submitted to the Conference Chairperson **by April 1, 2006.**

Please submit titles of papers to:

Dr. Alan Doster, Chairperson
University of Nebraska
Veterinary Diagnostic Center
Fair Street and East Campus Loop
Lincoln, NE 68583-0907

Abstracts of papers selected for presentation will be due **by April 15, 2006.**

Please forward abstracts to:

Mavis Seelmeyer, Conference Coordinator
University of Nebraska
Veterinary Diagnostic Center
Fair Street and East Campus Loop
Lincoln, NE 68583-0907

A wide variety of topics for presentation are welcome and include reports on diseases of poultry, interesting diagnostic cases, novel diagnostic methods, and recently recognized or emerging disease syndromes. Fifteen minutes will be allotted for the presentation of each paper. Abstracts will be published in a proceedings which will be distributed at the meeting. ***Abstract guidelines are described in detail on a separate page.***. **Graduate students are especially encouraged to attend and submit an abstract.**

GRADUATE STUDENT AWARD

An award of $100 will be awarded to the graduate student judged to have given the best oral presentation and highest quality paper. Papers and presentations will be judged by the Graduate Student Award Committee headed by Dr. Bruce Brodersen. The Committee will consist of five members, one from each of the following disciplines: bacteriology, pathology, toxicology, virology and a member-at-large.

Please share this information with interested persons in your area. We hope to see you in Lincoln
on **June 8th and 9th, 2006!**

NCCVLD
Abstract Guidelines

Margins: 1" margins on top and bottom of pages; 1 1/4" margins on left and right sides

Line Spacing: 1.5

Font: Times New Roman 12

Abstract Title: Center the Title on the first line of Abstract, bold, size 14

Abstract Author(s): Name, Title, Institution placed directly under the Abstract title, centered, size 12.

Please do not include page numbers, headers or footers in the Abstract.

Please place your references at the end of the Abstract.

Please identify abstracts to be considered for the Graduate Student Award by an asterisk after the presenter's name.

If you have any questions, please call Mavis Seelmeyer at (402) 472-8453.

Please also submit an electronic copy of your presentation in either Word or WordPerfect via E-mail to: mseelmeyer1@unl.edu

Send a hard copy to:
Mavis Seelmeyer
University of Nebraska
Veterinary Diagnostic Center
Fair Street and East Campus Loop
Lincoln, NE 68583-0907

45th North Central Veterinary Laboratory Diagnosticians Conference
Registration Form
June 8-9, 2006
Holiday Inn-Downtown, 141 N. 9th St., Lincoln, NE

Pre-registration is $75.00 and is due by May 5, 2006. Late registration is $80.00. Checks or money orders are payable to: Univ. of Nebr. Department of Veterinary and Biomedical Sciences. (We are unable to accept credit cards.)

Name: _____

University/Affiliation: _____

Mailing Address: _____

_____

City, State, Zip: _____

Name for Name Badge: _____

Amount Enclosed: _____

Please remit to: Mavis Seelmeyer
Univ. of Nebr.
151 Veterinary Diagnostic Center
Fair Street and East Campus Loop
Lincoln, NE 68583-0907

If you have any questions, please contact Mavis Seelmeyer at (402) 472-8453. Thank you.